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U. S. DEPARTMENT OF COMMERCE
Charles Sawyer, Secretary

OFFICE OF TECHNICAL SERVICES
John C. Green, Director

September 16, 1949

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PUBLISHED WITH THE APPROVAL OF THE
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CHEMICAL AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

PB 97791 Cassel, William A. IN VITRO ACTION OF SULFONAMIDE MIXTURES. Jun 1947. 19p illus, tables Mi $1.75, Ph $2.50. Thesis, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.
Experiments were conducted for the purpose of checking recent reports which claim that sulfonamide mixtures are more bactericidal than single sulfonamides at the same total concentration. Compounds tested were sulfadiazine, sulfathiazole, and a mixture of equal parts of the two. Bacteria employed were S. aureus, Ps. aeruginosa, E. typhosa, Serratia marcescens, E. coli, and a hemolytic streptococcus. Tabulated results show above claims to be justified in some, but not in all cases, and to depend upon the type of organism and mixture of drugs used.

PB 97780 Hipp, Allen J. EFFECT OF VITAMIN "B" COMPLEX AND SOME AMINO ACIDS ON YEAST GROWTH. May 1947. 194p photos, graphs, tables Mi $7.00 Ph $25.00.
Investigations were conducted to develop a synthetic wort of known composition which would be comparable to the natural brewers' wort. In observing the metabolic reactions of the yeasts in the same enviroment on the two types of worts, a nutrient value to the synthetic wort can be assessed. In the final analysis of the growth curves it is believed that a synthetic wort can be developed which is superior to the natural brewers' wort, not in the production of alcohol but in rapid fermentation. The controlling growth factor in practically all the experiments was found to be pyridoxine hydrochloride. The other vitamines of the B complex and nutrients played the supporting roles of growth factors. Research carried on at Marquette University, Milwaukee, Wis.

PB 97766 Hutchins, J. H. METHODS OF TESTING FOR BACTERIOSTASIS. Jun 1947. 18p illus, tables Mi $1.75, Ph $2.50.
Six testing techniques are described which were used to establish the bacteriostatic effect of 9-amino acridine hydrochloride on S. aureus, E. coli, Ps. aeruginosa, E. typhosa, S. marcescens, C. hoagii, B. subtilis, and B. mycoides. All techniques gave essentially the same results, whether the size of the inoculum was 1 cc or a 4-mm loopful of a 1:10 culture dilution. The hydrochloride was effective against both Gram positive and Gram negative organisms. Ps. aeruginosa was most resistant and C. hoagii least resistant. Research carried on at Philadelphia College of Pharmacy and Science, Philadelphia, Pa.

PB 97784 Rhodes, Russell IN VITRO TESTING OF QUARTERNARY AMMONIUM COMPOUNDS. May 1947. 18p illus, tables Mi $1.75, Ph $2.50. Thesis, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.
A new method of evaluating the bacteriostatic and bactericidal activity of quaternary ammonium compounds is described. The method was developed in experiments with several strains of Ps. aeruginosa and is based on the intensity of green pigmentation which this organism developed when growing in the presence of cetyl trimethyl ammonium bromide and cetyl pyridinium chloride.

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PB 97780 Hipp, Allen J. EFFECT OF VITAMIN "B" COMPLEX AND SOME AMINO ACIDS ON YEAST GROWTH. May 1947. 194p photos, graphs, tables Mi $7.00 Ph $25.00.
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PB 97784 Rhodes, Russell IN VITRO TESTING OF QUARTERNARY AMMONIUM COMPOUNDS. May 1947. 18p illus, tables Mi $1.75, Ph $2.50. Thesis, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.
A new method of evaluating the bacteriostatic and bactericidal activity of quaternary ammonium compounds is described. The method was developed in experiments with several strains of Ps. aeruginosa and is based on the intensity of green pigmentation which this organism developed when growing in the presence of cetyl trimethyl ammonium bromide and cetyl pyridinium chloride.

Drugs and Pharmaceuticals (Cont'd)

PB 97789 Stedman, R. L. BACTERIAL EFFICIENCY OF 9-AMINO-ACRIDINE HYDROCHLORIDE. Jun 1947. 18p tables Mi $1.75, Ph $2.50. Thesis, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.
Method is described which was used to test the efficiency of 9-amino acridine hydrochloride as a bactericide. Tests using S. aureus gave erratic and inconclusive results. A 1:6000 dilution of 9-amino acridine hydrochloride was bactericidal to the F.D.A. strain of E. typhosa in one hour. A 1:8000 concentration of the drug killed Ps. aeruginosa in one hour.

AGRICULTURAL CHEMICALS

PB 97361 Coaton, W. G. H. TOXIC-SMOKE GENERATORS FOR TERMITE CONTROL. Sep 1947. 16p photos, drawings Mi $1.75, Ph $2.50. Reprint No. 56 from Farming in South Africa, September, 1947.
This reprint from "Farming in South Africa", Sep. 1947, describes an applicator by means of which toxic smokes have been successfully introduced into the nest systems of the species of termites chiefly responsible for timber destruction in South African buildings and notes are given on the method of application to infestations out of doors and within buildings.

PB 97360 Tooke, F. G. C. USE OF PRESERVATIVES AGAINST WOOD-DESTROYING INSECTS. Apr 1948. 6p Mi $1.25, Ph $1.25. Reprint No. 17 from Farming in South Africa, April, 1948.
Methods of treatment together with the optimum absorption and penetration of various approved preservatives are discussed: Class A - creosote combinations, Class B - metallic salts in aqueous solutions, and Class C - oil soluable preservatives.

CHEMICAL ENGINEERING AND EQUIPMENT

PB 97196 Fajans, E. and Thompson, G. L. MANUFACTURE OF BORAX, BORIC ACID AND SODIUM PERBORATE IN THE WESTERN ZONES OF GERMANY. Nov 1946. 35p drawing, tables Mi $2.25, Ph $5.00. BIOS FR 1829, Item 22.

PB 70168t3 I. G. Farbenindustrie A. G., Höchst, Ger. DIRECTIONS FOR TESTING BUTANOL. Dec 1948. 10p tables Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $11.25. Micro FIAT O 18, Frames 7293-7299, trans.

PB 70222t4 I. G. Farbenindustrie A. G., Höchst, Ger. MANUFACTURING PROCESS FOR FINISHING AGENT, HOE 1/169: M-XYLOL-2,4,6-TRI(ETHYLENE UREA). Dec 1948. 3p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $3.50. Micro FIAT K 34, Frames 2246-2247, trans.

PB 70222t3 I. G. Farbenindustrie A. G., Höchst, Ger. MANUFACTURING PROCESS FOR SIZING AGENT HOE 1/127: POLYACRYLIC ACID OXETHYLAMIDE. Dec 1948. 2p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $2.00. Micro FIAT K 34, Frame 2192, trans.

PB 70063t9 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. DIRECTIONS FOR MANUFACTURING BUTANOL. Aug 1945. 5p drawing, table. Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $7.75. Micro FIAT G 23, Frames 265-270, trans. Drawing will not reproduce well.

PB 70063t10 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. MANUFACTURING INSTRUCTIONS FOR BUTYRALDEHYDE. Dec 1948. 4p drawing. Available from Research Information Service, 509 Fifth Avenue, New York 17, N.Y. $3.75. Micro FIAT G 23, Frames 271-273, trans. Legends in German. Drawing will not reproduce well.

PB 70063t7 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. MANUFACTURING INSTRUCTIONS FOR ETHYLAMINES. Dec 1948. 8p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $3.00. Micro FIAT G 23, Frames 162-165, trans.

PB 70063t8 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. MANUFACTURING INSTRUCTIONS FOR ETHYLENE OXIDE. Dec 1948. 13p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $11.00. Micro FIAT G 23, Frames 175-181, trans.

PB 70063t12 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. MANUFACTURING PROCESS FOR ACETYLAMINE. Dec 1948. 5p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $4.50. Micro FIAT G 23, Frames 560-563, trans.

PB 70063t11 I. G. Farbenindustrie A. G., Ludwigshafen, Ger. MANUFACTURING PROCESS FOR ANILINE. Dec 1948. 2p Available from Research Information Service, 509 Fifth Avenue, New York 17, N. Y. $3.00. Micro FIAT G 23, Frame 293, trans.

MISCELLANEOUS CHEMICALS

PB 97705 Badger, Richard M. INVESTIGATIONS OF THE FUNDAMENTAL CHEMISTRY OF CELLULOSE AND ITS DERIVATIVES. QUARTERLY PROGRESS REPORT NO. 7, MAR 1, 1948-MAY 31, 1948. Jun 1948. 12p graph, table Mi $1.75, Ph $2.50 Work conducted at California Institute of Technology for U. S. Office of Naval Research. Task order no. 6. Contract N6-Ori-102. The fundamental chemistry of cellulose and its derivatives was investigated. Light scattering studies of nitrocellulose solutions were extended to samples of very high molecular weight. Greatly improved infrared spectra of the sugars were obtained by the use of a new technique, and cellobiose and cellotriose were investigated by the same procedure. Physiochemical studies on a cellulose derivative containing iodine were completed and show abnormal properties. Small angle X-ray scattering studies on these materials was resumed. Conclusive results are not yet available.

PB 97706 Badger, Richard M. INVESTIGATIONS OF THE FUNDAMENTAL CHEMISTRY OF CELLULOSE AND ITS DERIVATIVES. QUARTERLY PROGRESS REPORT NO. 8, JUN 1, 1948-AUG 31, 1948. Sep 1948. 13p Mi $1.75, Ph $2.50. Work conducted at California Institute of Technology for U. S. Office of Naval Research. Task order no. 6, Contract N6-Ori-102.
This progress report summarizes the work done on the following investigations of the fundamental chemistry of cellulose and its derivatives: Light scattering studies, fractionation studies of nitrocellulose, infrared studies of carbohydrates, cellobiose octa-acetate, α and β sugars, compounds having structural similarities to the sugars; a) the pyranose ring, b) hydroxy-cyclohexanes, c) hexitoles; and characterization of iodine containing cellulose derivatives prepared for X-ray scattering studies.

PB 97880 British Intelligence Objectives Sub-Committee. MISCELLANEOUS GERMAN CHEMICAL PAPERS. 1939-1944. 377f diagrs (Text in German) Mi $9.00 Enl Pr $50.00. For abstracts in English see PB 97880s. Abstracts for Micro BIOS FD 3685/47, Frames 1-128 not included. 1. Plastics - Germany 2. Plasticizers - Germany 3. Tires, Rubber - Synthetic - Germany 4. Varnishes - Germany 5. Glycol - Germany 6. Rubber, Buna - Germany 7. Polyvinyl chloride - Chlorination - Germany 8. Fiberglas - Germany 9. Vinnol HH (Trade name) 10. Vinnol H (Trade name) 11. Igelit PCU (Trade name) 12. Ozokerit Lunacera 10364 (Plastic product) 13. Trolitul EF/Z (Plastic product) 14. Buna S (Trade name) 15. Buna (Trade name) 16. I. G. Farbenindustrie A. G., Schkopau, Ger. 17. I. G. Farbenindustrie A. G., Leverkusen, Ger. 18. Lüneburger Wachsbleiche J. Börstling A. G., Lüneberg, Ger. 19. Glasfaser Gesellschaft m.b.H., Düsseldorf, Ger. 20. Micro BIOS FD 2334/47, Frames 1-26+6 21. Micro BIOS FD 2420/47, Frames 1-26+A.B.C. 22. Micro BIOS FD 2521/47, Frames 1-3 23. Micro BIOS FD 2508/47, Frames 1-52 24. Micro BIOS FD 2558/47, Frames 1-33 25. Micro BIOS FD 2376/47, Frames 1-21 26. Micro FD 2375/47, Frames 1-43+4 27. Micro BIOS FD 2635/47, Frames 1-11+2 28. Micro BIOS FD 2641/47, Frames 1-5 29. Micro BIOS FD 2636/47, Frames 1-2 30. Micro BIOS FD 2887/48, Frames 1-3 31. Micro BIOS 1997/47, Frames 1-3 32. Micro BIOS FD 3685/47, Frames 1-128.

PB 97486 Bruijn, H. de and others. VISIT TO I. G. FARBEN, LUDWIGSHAFEN AND OPPAU, AND RASCHIG WERKE MÜNDESHEIM. Jun 1947. 113p drawings, graph, table Mi $4.75, Ph $15.00. 1. Chemical industries - Germany 2. Carbon monoxide - Production - Germany 3. Methane - Production - Germany 4. Methanol - Production - Germany 5. Acetylene - Production - Germany 6. Ethylene - Production - Germany 7. Phenol - Production - Germany 8. Aniline - Production - Germany 9. Acetone - Production - Germany 10. Anthracene - Production - Germany 11. Anthraquinone - Production - Germany 12. I. G. Farbenindustrie A. G., Ludwigshafen, Ger. 13. I. G. Farbenindustrie A. G., Oppau, Ger. 14. Raschig, F., G.m.b.H., Mundesheim, Ger. 15. TOR 90.

PB 770t Heisel, P. DIMETHYLISOPROPYL ACETIC ACID. Jan 1949. 3p Available from Transervice, Box 647, Kingsport, Tenn. $2.00 1. I. G. Farbenindustrie A. G., Gersthofen, Ger. 2. Dimethylisopropyl acetic acid - Germany 3. Scientific Zetko Exchange 4. TT 54.

PB 764t Fitzky, Herr THE ACID HYDROLYSIS OF ANILINE AND M-PHENYLENEDIAMINE. Jan 1949. 5p Available from Transervice, Box 647, Kingsport, Tenn. $3.00. 1. I. G. Farbenindustrie A. G., Hoechst, Ger. 2. Aniline - Hydrolysis - Germany 3. m-Phenylenediamine - Hydrolysis - Germany 4. Phenol - Production - Germany 5. Resorcinol - Production - Germany 6. Scientific Zetko Exchange 7. TT 53.

PB 791t Klarmann, P. SELECTIVE EXTRACTION OF INDENE FROM HEAVY BENZENE. Jan 1949. 4p Available from Transervice, Box 647, Kingsport, Tenn. $3.00. 1. I. G. Farbenindustrie A. G., Griesheim, Ger. 2. Indene - Isolation - Germany 3. Scientific Zetko Exchange. 4. TT 55.

PB 601t Krzikalla (Dr.) and Flickinger (Dr.) NEW VINYLEATHERS. REPORT II. Jan 1949. 4p Available from Transervice, Box 647, Kingsport, Tenn. $3.00. 1. I. G. Farbenindustrie A. G., Ludwigshafen, Ger. 2. Vinyl ethers - Preparation - Germany 3. Scientific Zetko Exchange 4. TT 51.

PB 97668 Littler, W. B. and Clapp, D. B. THE BIAZZI CONTINUOUS PROCESS FOR THE PRODUCTION OF NITROGLYCERINE OR NITROGLYCOL AT DYNAMIT A. G., SCHLEBUSCH. n.d. 57p photo, drawings Mi $2.75, Ph $7.50. 1. Nitroglycerine - Production - Germany 2. Dynamit A. G., Schlebusch, Ger. 3. BIOS FR 1842, Item no. 22.

PB 576t Mittag (Dr.) CATALYTIC OXIDATIONS WITH AIR IN LIQUID PHASE, VI: FURTHER RESULTS IN THE INVESTIGATION OF CYLOHEXANE OXIDATION. Apr 1949. 17p Available from Transervice, Box 647, Kingsport, Tenn. $5.00. 1. I. G. Farbenindustrie A. G., Uerdingen, Ger. 2. Cyclohexane - Oxidation - Germany 3. Cyclohexanol - Preparation - Germany 4. Cyclohexanone - Preparation - Germany 5. Resins - Germany 6. Scientific Zetko Exchange 7. TT 57.

PB 97425 Ploetz, Theodor and Pogacar, Peter THE SPECIFICITY OF B-GLUCANASES. May 1949. 12p graphs Mimeo: $.50. 1. Polysaccharides, Glucose 2. Helix pomatia 3. Cellulose - Saccharification 4. Lichenin 5. Acids, Luteinic 6. Yeast - Glucan 7. FIAT FR 1197.

PB 97807 Rubei, Frank INACTIVATING AGENTS FOR QUARTERNARY AMMONIUM COMPOUNDS. Jun 1947. 11p illus, tables Mi $1.75, Ph $2.50 Sixteen salts were tested as to their ability to neutralize or inactivate any detergent which is carried over into subculture transplants used in F.D.A. phenol coefficient tests. Staphylococcus aureus was the organism, and 0.1% solution of Ceepryn was the medicament used. Tabulated results contain data to show the degree to which each of the tested salts exhibited inactivation properties. Research carried on at Philadelphia College of Pharmacy and Science, Philadelphia, Pa.

PB 776t Scherer (Dr.) FLURO DERIVATIVES OF PROPANE AND BUTANE. Apr 1949. 6p Available from Transervice, Box 647, Kingsport, Tenn. 1. I.G. Farbenindustrie A. G., Hoechst, Ger. 2. Propane - Fluorine derivatives - Germany

PB 776t (Cont'd)
3. Butane - Fluorine derivatives - Germany 4. Fluorine - Organic compounds - Germany 5. Refrigerants - Germany 6. Scientific Zetko Exchange 7. TT 58.

PB 720t Spielberger (Dr.) THE ABSORPTION OF HYDROGEN CHLORIDE FROM GASES BY THE DRY METHOD. Jan 1949. 2p Available from Transervice, Box 647, Kingsport, Tenn. $2.00. 1. I. G. Farbenindustrie A. G., Leverkusen, Ger. 2. Hydrogen chloride - Absorption - Germany 3. Scientific Zetko Exchange 4. TT 52.

PB 97815 Thomas, D. D. LIQUID-VAPOR-SOLID EQUILIBRIA FOR AMMONIA-HYDRAZINE SYSTEM. PROJECT TU 2-1. Apr 1948. 20p diagrs, graphs, tables Mi $1.75, Ph $2.50.
Study was made of some of the physical properties of the binary ammonia-hydrazine system. From the results of experiments and mathematical treatment, it is concluded that the pressures over the binary liquid ammonia-hydrazine system do not differ radically from those predicted for an ideal system. The partial pressures of ammonia over the solutions show a positive deviation; i.e., the observed pressures are somewhat larger than those calculated for the ideal system. In the region of room temperature, the partial molar heat of solution of ammonia in hydrazine is 650 cal/gm mole for zero concentration of ammonia. Ammonia depresses the freezing point of hydrazine, the extent of which is predicted by use of the freezing-point-lowering equation. Research carried on at California Institute of Technology, Pasadena, Calif. Jet Propulsion Laboratory.

PB 811t Troskin (Dr.) SULFOSUCCINIC ACID ESTERS. Jan 1949. 3p Available from Transervice, Box 647, Kingsport, Tenn. $2.00. 1. I. G. Farbenindustrie A. G., Mainkur, Ger. 2. 2-Ethyl hexanol - Germany 3. Wetting agents - Germany 4. Succinic acid - Derivatives - Germany 5. Dismulgan VII - Germany 6. Scientific Zetko Exchange 7. TT 56.

PB 97490 Veld, F. In't and others. REPORT OF THE VISIT TO SOME PHARMACEUTICAL AND CHEMICAL FACTORIES IN THE AMERICAN AND FRENCH ZONE OF GERMANY. Feb 1947. 63p drawing, tables Mi $3.00, Ph $8.75.
1. Pharmaceuticals - Production - Germany 2. Chemicals - Production - Germany 3. I. G. Farbenindustrie A. G., Höchst, Ger. 4. Merck, E., Darmstadt, Ger. 5. Boehringer, C. F. & Söhne G.m.b.H., Mannheim, Ger. 6. TOR 72.

FUELS AND LUBRICANTS

PB 97758 Altman, R. W. and Jukkola, E. E. VISCOSITY CURVE OF A TYPICAL JET FUEL. Feb 1947. 3p graph, table Mi $1.25, Ph $1.25.
Viscosity and temperature curves were determined for a typical jet propulsion fuel. A sample of grade JP-2, specification AN-F-34, fuel was used for all determinations. The kinematic viscosity varied, respectively, from 0.98 to 29.7 centistokes at temperatures ranging from 100°F to - 76°F (freezing point).

PB 97799 Aston, J. G. HEAT CAPACITY, ENTROPY AND HEATS OF FORMATION OF CERTAIN COMPOUNDS. Aug 1948. 8p Mi $1.25, Ph $1.25.
In association with the development of fluid propellants, progress accomplished in the construction of calometric assemblies with and without valves is discussed, and heats of combustion of hydrazines are analyzed. Heat capacities of the empty calorimeter were determined from 80 to 225°K to test the performance of the automatic controls. In determining these heat capacities, certain temperature ranges were covered separately under varying conditions, determining the precision of the calorimeter as well as the reproducibility. Heat capacities and intercomparisons were also determined to 85°K between the S-3 thermocouple and resistance thermometer. The series of measurements of the heat of combustion of benzoic acid was completed and considerable preliminary work was done in connection with the preparation of sample bulbs of methyl hydrazine for combustion. Two platinum resistance thermometers were constructed and are at present being calibrated. Research carried on at Pennsylvania State College, Cyogenic Laboratory, State College, Pa.

PB 97748 Bernard, Rubin APPARENT VISCOSITY OF GREASES. Apr 1948. 45p photos, graphs, tables Mi $2.50, Ph $6.25.
Rate of shear-apparent viscosity diagrams for several greases have been determined at three temperatures, and it is shown that these curves define the unworked consistency (flow properties) of a grease at all temperatures. Apparent viscosity, ASTM penetration, and plasticity number of the greases are compared; but no correlation of these three properties can be made at low temperatures. The conclusion drawn from the comparison is that apparent viscosity alone does not define low temperature properties of a grease. AAF TR 5685.

PB 97765 Bowen, J. Hartley REPORT ON VISCOSITY TESTS OF CORROSION PREVENTIVE COMPOUND - GRADE 1120 OIL GASOLINE MIXTURES AND CORROSION PREVENTIVE COMPOUND GRADE 1065 OIL MIXTURES. Jan 1943. 17p graphs, tables Mi $1.75, Ph $2.50.
Tests were run to investigate whether certain corrosion-preventive compounds are soluble in 3 parts by volume of grade 1065 oil and to determine pour points and Saybolt universal viscosities of the mixtures at 100° and 210°F. Furthermore, Saybolt Universal viscosities of 3-1 by volume mixtures of grade 1120 oil and AN-VV-C-576 corrosion preventive compounds, containing 5, 10, 15, and 25% by volume of grade 65 gasoline, were to be ascertained. Results of tests showed that approximately 7.5% gasoline by volume in a 3-1 mixture of 1120 oil - compound would have the same general viscosity characteristics as a 3-1 mixture of 1065 oil-compound. Research carried on at U. S. Naval Aircraft Factory, Engineering Div., Philadelphia, Pa.

PB 97773 Breitmayer, Theodore METHODS OF INCREASING THE DENSITY AND STRENGTH OF CHARCOAL BRIQUETS. 1948. 39p diagrs, graphs, tables Mi $2.25, Ph $5.00.
A research was conducted to find out if the abundant waste-wood produced by almost every industry using wood can be exploited for the production of a high-carbon, low ash grade of charcoal. In this investigation, the bearing of particle

PB 97773 (Cont'd)
size on density of the charcoal and subsequent briquets were studied, and the effect of carrying out the briquetting operation under vacuum was analyzed. In addition, the usefulness of briquetting hot and cold, and the effect of mixing pulverized and unpulverized charcoal was investigated. Eight individual conclusions were gained, which are described in detail. Research carried on at University of Washington, Seattle, Wash.

PB 97785 Breza, C. J. and others. DETERMINATION OF FREE ACID AND FREE ALKALI IN ASTM GREASES G 1-6 to G 1-13. (MLC NOS. 2826 to 2833 INCLUSIVE). Nov 1946. 31p graphs, tables Mi $2.25, Ph $5.00.
Tests were conducted on eight samples of grease for the purpose of improving the ASTM method D128-40 for the determination of free acid and free alkali in grease. The test methods employed included the ASTM D128-40, the Texas, and the Whiting volumetric methods and determination by electrometric titration. The former three methods were found to be all similar, when the sample greases were alkaline, but dissimilar when the greases were acid. For combined consistency in purpose of analysis, ease of manipulation, and reproducibility, the Whiting method, using color indicator, appears to be the most advantageous. ASTM method D128-40 has distinct disadvantages; for acid greases, co-existing free alkali is completely disregarded, while for alkaline greases co-existing free acid is taken into account, but only excess free alkali is determined. The Texas method, while employing an excellent solvent, is also inconsistent. Electrometric titration proved least reliable of all methods. AAF TSEAM MR 5295.

PB 97731 Buck, Charles E. DETERMINATION OF AROMATIC CONTENT OF JET PROPULSION FUELS. CO-OPERATIVE TEST PROGRAM A.S.T.M. Oct 1946. 28p drawings, graphs, tables Mi $2.00, Ph $3.75.
Tests were conducted to analyze samples of jet propulsion fuels and to investigate procedures developed by cooperating agencies for aromatic content of jet propulsion fuels. The fuels used for these tests were PPF-45-6 (aromatic), PPF-45-7 (paraffinic), and PPF-45-25 (naphthenic). The aromatic analyses from E.S. 45a ASTM and Bureau of Mines are in good agreement for fuels which are of comparatively low aromaticity. However, PPF-45-6 which is of higher aromaticity, showed considerable variance between the two methods. It appears that the Kurtz method may be of more value than that of the Bureau of Mines in that the Kurtz method offers the additional data of wt% side chain of the aromatic fractions and wt% naphthene rings of the naphthenic fraction. The Deanesly-Carleton method seems less likely to be of general use, as the precise measurements required cannot be determined in a general laboratory. AAF TSEAM M5206.

PB 97787 Buffalo Electro - Chemical Co., Inc., Buffalo, N. Y. SAFETY CODE FOR BECCO 90% HYDROGEN PEROXIDE (H_2O_2). May 1947. 11p drawings Mi $1.75, Ph $2.00.
In an attempt to devise a safety code for BECCO 90% H_2O_2, the general properties, chemical and physical characteristics, and health hazards and other hazards of hydrogen peroxide are analyzed, and proper methods of transporta-

PB 97787 (Cont'd)
tion, storage, handling, and arrangement of test stands and areas are discussed. Since H_2O_2 is a vigorous oxidizing agents, contact with oxidizable materials should be prevented. The most effective combative agent for H_2O_2 fires is water, and there should be an adequate supply and drainage system, wherever H_2O_2 is to be used or handled. All containers for H_2O_2 must be vented, as the decomposition of hydrogen peroxide evolves oxygen and water vapor.

PB 97747 Clark, F. B. and Sappington, M. H. STUDY OF THE IGNITION LAG OF SPONTANEOUS ROCKET PROPELLANTS (PROJECT TU2-1). Jun 1947. 37p photos, diagr, graphs, tables Mi $2.25, Ph $5.00. California Institute of Technology. Jet Propulsion Laboratory. Memorandum no. 9-3 Project no. TU 2-1.
A study was made of the ignition lag of red fuming nitric acid and aniline rocket fuels. It was found that under any one set of conditions it was possible to reproduce data consistently within 10%. At temperatures near the freezing point of aniline, ignition lags were of the order of 12 to 16 milliseconds. On reaching ordinary room temperatures the lag was reduced by a factor of three or four. Beyond this range the effect of temperature was not so pronounced. It is shown that a small percentage of water as an impurity in acid will produce little noticable effect on ignition. For relatively pure acid and commercial grade aniline, 3 to 5 milliseconds were required to build up a pressure of two inches of water in a chamber of 2.655 liters volume. It was shown that drops having volumes of more than about 0.0475 milliters produced approximately the same ignition lags. Results of these tests are shown in various charts and graphs.

PB 97768 Coordinating Research Council, Inc., New York, N Y. ANALYSIS OF RESULTS OF AAF-CRC FUEL VOLATILITY TEST PROGRAM, WINTER 1946-47. Apr 1948. 47p graphs, tables Mi $2.50, Ph $6.25.
Flight tests were conducted to investigate the effect of fuel volatility, as expressed in terms of distillation temperatures, on the lean misfire or roughness limits for ambient temperatures ranging from -7° to 30°F. Wright R-3350-57 head-injection-engines installed in a B-29 bomber and P & W R-5360-27 caburetted engines, installed in a C-47 transport, were used for the tests. Results showed that the most volatile fuel generally permitted the leanest operable mixture for a given set of operating conditions. Any chance in engine operating conditions that produced a larger temperature rise through the induction system improved the performance of all test fuels. By controlling engine cooling so as to obtain an increase in average cylinder-head temperature, engine performance was likewise improved.

PB 97732 Davis, William D. and others. TECHNICAL REPORT ON THE THERMAL PROPERTIES OF SOME HYDRIDES: THE HEATS OF FORMATION OF SODIUM BOROHYDRIDE, LITHIUM BOROHYDRIDE, AND LITHIUM. Dec 1943. 30p drawing, diagr Mi $2.00, Ph $3.75. University of Pittsburgh, Dept. of Chemistry. Contract no. N6-ORI-43, Task order #1.
The heats of reaction of sodium borohydride, lithium aluminum hydride, and lithium borohydride with dilute hydrochloric acid were measured calorimetically to determine the heats of formation of the compounds. The heat effect was

PB 97732 (Cont'd)
measured with an accuracy of 0.1%. The specific heats and densities of the three hydrides were determined and other thermal data were obtained so that the heat of formation of the hydrides at 25°C could be calculated. Methods were devised for increasing the purity of the crude hydrides to better than 99%. An apparatus was constructed to determine the purity of the compounds by measuring the amounts of hydrogen liberated by their reaction with dilute acid with a precision and accuracy of better than 0.1%.

PB 97770 Dobo, Emerick Joseph SILENT ELECTRICAL DISCHARGE METHOD FOR THE PRODUCTION OF HYDROGEN PEROXIDE. 1948. 58p photo, diagrs, graphs, tables Mi $2.75, Ph $7.50.
A working apparatus was set up for the production of hydrogen peroxide by electrical discharge synthesis. In this apparatus basic variables of flow rate, composition and numidity of incoming gases, temperature of reaction, and the discharge voltage can be independently changed. It was the aim to establish yield relationships with these basic variables in an attempt to overtake yields obtained by German scientists. The apparatus consists of flow regulator and recorder, a humidifier, a preheater, a discharge tube, and an absorber. Each of these components is discussed individually. The best yields thus far obtained of 15.3 gms per kwh were obtained under the following conditions: hydrogen flow rate or 48.5; hydrogen-oxygen ratio 95:5; humidity temperature 83°C; reaction temperature 123°C; voltage 10,000; and washing with hot nitric and hot phosphoric acids. Research carried on at University of Washington, Seattle, Wash.

PB 97744 Dreyhaupt, F. FREMDZÜNDGREN ON VON ALKOHOL-DAMPF IN LUFT ODER O_2. (ON THE HETEROGENEOUS IGNITION LIMITS OF ALCOHOL VAPOR IN AIR OR O_2). May 1943. 17p graphs, tables (Text in German and English) Mi $1.75, Ph $2.50. Consolidated Vultee Aircraft Corp., San Diego, Calif. Report GT-668.
The upper and lower limits of the "foreign" ignition delay of ethyl-alcohol vapor mixtures in air or O_2 are analyzed. A distinction is made between the auto-ignition delay limit of the igniting substance and the "foreign" ignition of the combination of the mixture. After surveying the data of other authors on pertinent foreign ignition limits, it is concluded that a safe ignition range for a mixture of ethyl-alcohol vapor and air at 14.22 psia pressure 20°C, and electric spark ignition extends approximately from 2.5 to 20% volume alcohol vapor contents of the mixture. With a dropping pressure, it can be assumed that the two ignition limits stay first about constant, then approach each other rapidly, and coincide above 300 mm Hg pressure and at about 7% volume alcohol contents so that below this critical pressure a "foreign" ignition with subsequent flame and explosion phenomena should not be expected any more.

PB 97755 Fox, A. H. PERFORMANCE STUDIES OF AVIATION FUELS EMPLOYING HIGH ANTI-KNOCK BLEND AGENTS. PRELIMINARY APPRAISAL OF THE PROBLEM. Dec 1948. 4p tables Mi $1.25, Ph $1.25. Standard Oil Co. (Indiana) Whiting Laboratory. Report no. 1.
A study was made to determine the combustible properties aviation fuel with

PB 97755 (Cont'd)
more than 100+octane rating. This study indicates that such a fuel would consist of high quality aviation alkylate, neohexane, diispropyl and assorted aromatics (toluene and xylen) with sufficient isopentane to insure maximum volume consistent with volatility and vapor pressure requirements. Employment of both conventional knock test methods and a 17.6 single cylinder test engine under a variety of conditions indicate the optimum limit for aromatic content is about 10% if a reasonable relation between "lean" and "rich" performance ratings is maintained. The optimum composition of the potentially available fuel is shown. No immediate need for this "super" fuel is anticipated.

PB 97752 Gray, Peter DETERIORATION AND DEGRADATION OF HYDROCARBONS DUE TO THE ACTION OF ANAEROBIC MICROORGANISMS. FIRST REPORT, OCT 1, 1948 to JUN 30, 1949. Jan 1949. 6p Mi $1.25, Ph $1.25
Progress is reported in research conducted to investigate the deterioration and degradation of hydrocarbons due to the action of anaerobic microorganisms. The personnel employed, facilities and equipment, and preliminary work are outlined. The anaerobic organisms and hydrocarbons which were ordered are listed, and the test procedure is briefly described. The hydrocarbons will be innoculated with the organisms and incubated at 37°C in a H_2 atmosphere for 7 days. Cultures will then be checked for turbidity, decomposition, and pH, and plate counts will be made. Hydrocarbons will be tested with mineral salts solutions and innoculated with both aerobes and anaerobes and the products compared with samples of hydrocarbons tested without mineral salts solutions to determine if the end products of the two methods differ in composition. Research carried on at University of Pittsburgh, Pittsburgh, Pa.

PB 97783 Greenpan, F. P. and others. COMPATIBILITY OF ENGINEERING MATERIALS WITH BECCO 90% HYDROGEN PEROXIDE. May 1948. 61p graph, table Mi $3.00, Ph $8.75.
A description is given of the detailed study made of the compatibility of 90% H_2O_2 with various engineering materials. The 66 deg. C. long-time contact test, supplemented by a 30 deg. C. test, has been found to be an excellent index of compatibility. This test serves as an accelerated test together with a fair tolerance for upper temperature storage conditions. For prolonged storage contact of unstabilized H_2O_2, BECCO Standard Grade, recommended engineering materials are limited to pure aluminum and various selected plastics. For short time contact leading to storage, a wider range of materials is permissible. It is emphasized that proper cleaning and pickling of all surfaces is indispensible to satisfactory results in handling 90% H_2O_2. Research carried on at Buffalo Electro-Chemical Co., Inc., Buffalo, N. Y.

PB 97736 Griffin, D. N. CRITICAL POINT OF NITROMETHANE (PROJECT TU2-1). Apr 1948. 14p diagrs, graphs Mi $1.75, Ph $2.50. California Institute of Technology, Pasadena, Calif. Jet Propulsion Laboratory. Memorandum no. 9-11.
A study was made to determine the critical temperature of nitromethane. A discussion is given concerning the previous experiments made along this line. To obtain the critical point of nitromethane, a plot was made of log p vs 1/T

PB 97736 (Cont'd)
for each test and compared with a similar plot of the vapor pressure of nitromethane. The temperature at which the break (indicating a transition to a single-phase system) occurred, and the nature of the curve above that temperature, depended upon the size sample used. A plot was made of the transition points vs sample size. It was concluded that this method offers a means of determining graphically the values for t_c,p_c, and d_c for liquids having high critical temperatures. This methid is limited in accuracy only by the accuracy of the measuring instruments. Critical constants obtained for nitromethane were: t_c=315 $\pm$ 1°C; p_c=915 $\pm$ 15psia; d_c=0.352 $\pm$ 0.004 gm/cc.

PB 97733 Jeffrey, R. E. DEVELOPMENT OF ENGINE OILS FOR MILITARY SERVICE, F & L PROJECT NO. 3-1. Aug 1945. 48p photos, tables Mi $2.50, Ph $6.25.
The development of heavy-duty engine oils and the action taken in providing an adequate specification are described. The engine tests, developed by the Caterpillar Tractor Co and the Research Laboratories Division of General Motors Corporation for their respective qualification programs, previously formed the basis for qualification under U.S. Army specification 2-104A. Representative proving-ground tests confirmed consistent reports from many sources that field experience with heavy duty engine oils, meeting the requirements of U.S. Army specification 2-104B, has been most satisfactory, both in gasoline and Diesel operation, and under high and low temperature conditions. Research carried on at U. S. Ordnance, Dept. of Research and Materials Division, Washington, D. C.

PB 97741 Longwell, J. P. FUEL OIL ATOMIZATION. May 1943. 163p photos, diagrs, graphs, tables Mi $6.25, Ph $21.25.
Atomization of fuel oils by pressure atomizing nozzles was investigated. High speed photographs indicate that under some conditions the spray cone is subjected to rapid fluctuations of approximately sonic frequency. The effect of these fluctuations is to increase the drop size above what it would be if the fluctuations did not occur. It was found that the effect of the fluctuations was less serious as the atomizing pressure was increased and the viscosity of the fluid decreased. The particle size and size distribution depend on the properties of the medium in which the atomization takes place, the energy of the fluid as it leaves the nozzle, the physical properties of the fluid atomized, and the dimension of the spray cone. It also has been found that the cone angle effects the drop size distribution, and that the cone angle decreases with increasing viscosity but does not change with pressure. Research carried on at Massachusetts Institute of Technology, Cambridge, Mass.

PB 97742 Miller, E. F. and others. SYMPOSIUM ON AVIATION RECIPROCATING ENGINES AND THEIR FUELS. Sep 1948. 97p photos, graphs, tables Mi $4.25, Ph $12.50.
At a symposium on aviation reciprocating engines and their fuels a series of papers were presented on the subjects of fuel volatility and engine requirements, correlation of knock test technique and problems associated with tetraethyl lead depositions. The preignition problems were reviewed from the standpoint

PB 97742 (Cont'd)
of cause, effect and possible correction. Fuel stability was discussed with respect to induction system deposits, their causes and possible solutions. It was emphasized that it is essential that all possible improvements be made in existing engines and fuels to obtain greater power and reliability and to decrease the specific fuel consumption. Published by Coordinating Research Council, Inc., New York, N. Y.

PB 97734 Penner, S. S. EVAPORATION OF LIQUID DROPLETS IN A ROCKET MOTOR. Sep 1947. 29p graphs, tables Mi $2.00, Ph $3.75. California Institute of Technology, Pasadena, Calif. Jet Propulsion Laboratory progress report no 9-13.
An investigation is presented which was designed to estimate, by employment of an approximate treatment, a reasonable upper limit for the rate of droplet vaporization in a rocket chamber. It is shown that the rate of droplet vaporization depends upon the nature of the evaporating liquid and upon the heat transferred to the liquid droplets after injection into the combustion chamber. The minimum life of a liquid droplet in a rocket chamber may be calculated by using an upper limit for the heat transfer and also for the isothermal rate of decrease of droplet radius with time. The order of magnitude of the upper limit for the isothermal rate specified is calculated from the Knudsen equation.

PB 97743 Stuart, H. MESSUNG DER VISKOSITÄT VON FLÜSSIG EM SAUERSTOFF ... -180°C. (MEASUREMENT OF THE VISCOSITY OF LIQUID OXYGEN IN THE REGION BETWEEN-150°AND -180°C). Feb 1942. 25p diagr, graph, table (Text in German and English) Mi $2.00, Ph $3.75. Consolidated Vultee Aircraft Corp., San Diego, Calif. Report GT-771.
The problem of determining the viscosity of liquid oxygen at saturation pressure in the region between -150°C and -180°C is discussed. As the result of investigations, two instruments were constructed which permit the measurement of viscosities at high pressure and at low temperatures, as the viscosimeters previously used were unsuitable at higher pressures. Experimental results using the two viscosimeters and their accuracy were discussed. A comparison was also made with theoretical principles.

PB 97769 Webb, Allen N. and others. INFRA-RED AND RAMAN SPECTRA AND THE THERMODYNAMIC PROPERTIES OF DIBORANE, BY ALLEN N. WEBB, JOHN T. NEU AND KENNETH S. PITZER. THE ULTRAVIOLET ABSORPTION AND LUMINESCENCE OF DECABORANE, BY GEORGE C. PIMENTEL AND KENNETH S. PITZER. Dec 1948. 28p graphs, tables Mi $2.00, Ph $3.75. University of California. Dept. of Chemistry, Technical report.
Deuterated diborane was prepared by isotopic exchange and its infra-red absorption spectrum was measured. Redetermination of the Raman spectrum of normal diborane indicates several changes from previous assignments. The resulting vibrational assignment was used to calculate the thermodynamic properties of diborane in the range 100-1500°K. The ultra-violet absorption spectrum of decaborane in cyclohexane shows a broad absorption with a maximum molecular extinction coefficient of 3200 100 at wave length 2720 50 A.

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The luminescence of decaborane dissolved in a glass at 77°K shows a continuous fluorescence extending from 3630 50A°. The energy levels of a particle in a rectangular, hemispherical, and spherical box were used to test the applicability of a metallic model to decaborane. Agreement with the absorption spectrum and the molecular dimensions was obtained.

PB 97792 Wimpress, R. N. and Sage, B. H. COMPOSITION OF THE PRODUCTS OF REACTION OF GASOLINE AND LIQUID OXYGEN. Mar 1944. 20p graphs, tables Mi $1.75, Ph $2.50. California Institute of Technology, Guggenheim aeronautics Laboratory. Galcit project no. 1, Progress report no. 19. Calculations of composition of reaction products of gasoline and pure liquid oxygen show that maximum specific impulse is obtainable with an approximately 2.5 weight ratio of oxygen to gasoline. Nitrogen present in oxidants leads to significantly lower impulse for a given reaction temperature. A 0.3 weight fraction nitrogen in the oxidant yields about the same specific impulse as aniline-nitric acid. Paraffinic gasolines are preferable fuels. Difference between aromatic and paraffinic fuels is slight.

PB 97753 Zima, Gordon E. SOME LIQUID OXYGEN SHOCK SENSITIVITY TESTS. Jun 1946. 13p photo, drawing, table Mi $1.75, Ph $2.50. California Institute of Technology. Jet propulsion Laboratory. Progress report no. 1-50. Simple approach is made to problems of identifying lubricants and packings which would present a hazard in a liquid-oxygen atmosphere subject to pressure shocks. Detailed descriptions are given of test apparatus and tests. Test conditions imposed on several liquid oxygen lubricant combinations were severe. Hence, all present lubricants prove dangerous in liquid-oxygen environment. In applications such as thread lubrication where quantity of lubricant in contact with oxygen is small, lubricant qualities of these substances balance their potential danger.

INSTRUMENTS

PB 97878 Brush Development Company, Cleveland, Ohio. PRELIMINARY WORKING PLANS, MODEL JQ UNDERWATER SOUND RECEIVING EQUIPMENT. Jan 1943. 4p drawings only Mi $1.25, Ph $1.25. 1. Sound, Underwater - Receiving equipment 2. JQ (Underwater sound receiving equipment).

PB 97389 Corrsin, Stanley EXTENDED APPLICATIONS OF THE HOT-WIRE ANEMOMETER. Apr 1949. 62p graphs Mi $3.00, Ph $8.75.
Two new fields of application of the hot-wire anemometer are proposed, and the appropriate response equations and measuring procedures are developed. The first analysis leads to a method for the measurement of physically significant statistical quantities in a turbulent flow with heat transfer. The second analysis involves the use of the hot-wire in the turbulent isothermal mixing of two appropriately different gases. NACA TN 1864.

PB 97638 Craggs, J. W. THE APPLICATION OF THE HODOGRAPH METHOD TO PROBLEMS OF SUBSONIC COMPRESSIBLE FLOW IN TWO DIMENSIONS. Jul 1946. 16p drawings Available from British Information Services, 30

Instruments (Cont'd)
PB 97638 (Cont'd)
Rockefeller Plaza, New York 20, N. Y. $1.00.
The hodograph equations for two-dimensional, irrotational, compressible flow are derived and reduced to the simplest form. The problems of assigning boundary conditions and of transforming hodograph solutions into the flow plane are discussed. It is shown that the approximate solutions of the flow equations in which powers of the Mach number greater than the second are neglected, and the Prandtl-Glauert solutions for linear perturbations are both included in the Karman-Tsien solution using a linearized equation of state. A general method is given for the use of the linearized equation of state for flows round aerofoils, with circulation present, and as a illustrative example the flow for a symmetrical Joukowsky aerofoil is calculated at angles of incidence zero and 0.05 radian = 2^{o} 52' for a stream Mach number of 0.6. ARC RM 2273.

PB 97539 Dowker, Y. N. and Redheffer, R. M. AN INVESTIGATION OF RF PROBES. Feb 1946. 68p graphs Mi $3.00, Ph $8.75.
After considering errors from non-linearity and slope, we investigate the effect of probe reflection P exp (iP') on the measured value of R, the true load reflection. If P' = π, which is proved true for tuned probes, the general relations become: measured R = PG (R = O), = R (1-P)/(1-R^2P) (G = O), where G = generator reflection. If G = O, minimum positions are nearly unchanged as are high $(SWR)^{2}$'s when measured by the twice-minimum technique. Measured never exceeds true reflection if G = O and the probe is thin. With given probe depth, P is maximum; for given pickup P is minimum, when the probe is tuned. We investigate: the effect of matching generator to load; the effect of arbitrary R, G, P', P; probe power versus position; seven non-standard methods of reflection measurement; and general properties of probes. All important relations are plotted and experimentally verified. Curves are given for true versus measured $(SWR)^2$ whenever P is known, and equations for R from measured points on the standing-wave curve without P. NDRC 14-262.

PB 97548 Goldstein, David L. and Scherrer, Richard DESIGN AND CALIBRATION OF A TOTAL-TEMPERATURE PROBE FOR USE AT SUPERSONIC SPEEDS. May 1949. 17p photo, diagr, graphs Mi $1.75, Ph $2.50.
The results of a study of the factors involved in the design of total-temperature probes for use at supersonic speeds have been applied to the design of an instrument to be used in wind-tunnel calibrations. Tests of the probe showed that the calibration factor required in the conversion of the measured temperature to the true total temperature was 0.992 + 0.002 for a range of Mach numbers between 1.36 and 2.01. The calibration factor was insensitive to angles of inclination relative to the air stream up to 9^{o} at a Mach number of 1.50. NACA TN 1885.

PB 97797 Stephenson, S. T. and Mason, F. D. RESEARCH IN THE VACUUM X-RAY REGION FROM 3 TO 20 ANGSTROMS, PERIOD 1 OCT TO 30 NOV 1947. Nov 1947. 3p Mi $1.25, Ph $1.25. Includes abstract of "The continuous spectrum of X-rays at long wave lengths".
Data on the continuous spectrum of W, Cu, and A_1 are being reduced and corrected for background, counter efficiency, window absorption, and plurality of

Instruments (Cont'd)
PB 97797 (Cont'd)
orders. Geiger counters having windows of A_1 only 0.0003-in. thick have been constructed and are in use. With the new counters, runs are now being made at voltages of 2.5 and 1.5 kv. extending out to 13 A. An abstract of the paper "The Continuous Spectrum of X-rays at Long Wave Lengths" is included. Research carried on at Washington State College, Pullman, Wash.

PB 97533 U. S. Army Air Forces. Air Proving Ground Command, Elgin Air Force Base, Florida. OPERATIONAL SUITABILITY TEST OF THE WAKEFIELD COMPASS COMPENSATOR. Mar 1949. 16p photos Mi $1.75, Ph $2.50. APGC Proj 4487-5.

PB 97957 Wittebort, J. I. THE ELECTRON MICROSCOPE AND ITS APPLICATION TO MATERIALS PROBLEMS. Jan 1949. 45p photos, diagrs, graphs, tables Mi $2.50, Ph $6.25.
The theory, applications, limitations, and specimen preparation techniques regarding the application of the electron microscope to the study of materials are discussed. The instrument is capable of revealing in great detail the size and shape of finely divided materials and the structure of metal surfaces, etc., far beyond the resolution of the best light microscope. The effects of wavelength on resolution, the problems associated with the design and development of magnetic and electrostatic electron microscopes and the details of image formation are explained. The methods commonly used for preparation of specimens and surface replicas are described, together with a series of electron micrographs which illustrate the fields of application to materials problems. AAF T-2 TR 5754.

PB 97240 Wong, Ming S. DETECTOR FOR MEASURING RF VOLTAGE CHARACTERISTICS AND CIRCUIT CONTINUITY IN COAXIAL LINES. n.d. 7p drawings Mi $1.25, Ph $1.25. 1. Radio frequency power - Measurements 2. Demodulators.

LEATHER AND LEATHER PRODUCTS

PB 97529 Ellis, William J. FELLMONGERING PRACTICE IN GERMANY AND MAZAMET (FRANCE). Jun 1946. 65p photos, drawings, tables Mi $3.00, Ph $8.75. BIOS FR 1006, Item 22.

PB 98018 Horigan, Francis D. and Sage, Cary R. MYCOLOGY OF LEATHER, A BIBLIOGRAPHY. Dec 1948. 47p Mi $2.50, Ph $6.25.
This bibliography consists of abstracts upon all phases of the mycology of leather. Emphasis is placed upon dressings, impregnants, etc., applied to leather for fungicidal, fungistatic or disinfectant purposes. The scope of the study covers the years 1925-1948, the abstracts being arranged in reverse chronological order. No claim is made that the bibliography is complete but it does contain a representative cross-section of the published and patent literature covered by this period. Abstracts were gleaned from domestic and foreign periodicals, abstract journals and patent specifications. An appendix at the end of this compilation provides a name and subject index as well as a

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key to the bibliographical symbols mentioned in the preceding paragraph. QMC TL BS 4.

PB 97711 Jikkola, Elmer E. EVALUATION OF THE CONDITION OF DOPED FABRIC SURFACES BY THE MULLEN BURST STRENGTH TEST AND OTHER METHODS. May 1948. 30p photos, tables Mi $2.00, Ph $3.75.
An investigation was conducted to determine the suitability and reproducibility of the Mullen burst-strength test for evaluating the condition of doped-fabric surfaces. Tests were conducted on freshly prepared doped fabric panels with standard airplane cloth and weakened cloth. Variations in doping procedure and amounts of dope film applied were included in the evaluation of these test panels. The data assembled indicate that Mullen readings of approximately 200 for doped fabric after exposure should be considered borderline between a satisfactory and an unsatisfactory condition. Cellulose-nitrate dope fabric finishes showing values of less than 180 were considered unsatisfactory. It was determined that a complete evaluation of the condition of the fabric required cutting a sample from the surface. AAF TR 5700.

LUMBER AND WOOD PRODUCTS

PB 97771 Boegli, C. P. WARTIME GERMAN WOOD TECHNOLOGY. Mar 1948. 30p graph Mi $2.00, Ph $3.75.
The wood situation, physical utilization of wood, wood conversion, and chemicals from wood for wartime Germany are discussed. Besides the use of ordinary sawed wood for structural purposes, several types of improved and strengthened wood were in the commercial and experimental stage, and work was concerned with the improvement of plywood. The manufacture of paper, paperboard, and related products consumed several types of pulp. Although sulfite pulping plants appeared old-fashioned and somewhat inefficient and the quality was more or less dependent upon the experience of the operator, sulfite pulp of a superior quality was produced, and the paper was equally outstanding. German improved and modified wood technology seemed to be somewhat behind American developments in the same filed. On the other hand, the applications of improved wood were considerably more widespread than in the case in America. Research carried on at Polamold Research Laboratories, Inc., Springfield, Ohio.

PB 98103 Clapp, William F. THE MARINE BORER PROBLEM. 1949. 3p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98102 Day, William C. and others. THE BIOLOGICAL DEGRADATION OF LIGNIN. I. UTILIZATION OF LIGNIN BY FUNGI. II. ISOLATION AND PROPERTIES OF A LIGNIN-OXIDIZING ENZYME. 1949. 37p photos, graphs, tables Mi $2.00, Ph $5.00 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.). Work done under contract no. N7 onr 397-4. NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98111 Dhein, E. H. WOOD AS A MATERIAL OF CONSTRUCTION FOR LAND AND SHORE BASED STRUCTURES. 1949. 5p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98104 Edmondson, Charles E. MARINE WOOD BORERS OF THE PACIFIC, A SURVEY BY THE U. S. NAVY. 1949. 14p photos, tables Mi $1.75, Ph $2.50 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D.C.). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 97353 Gt. Brit. Forestry Commission FIFTH BRITISH EMPIRE FORESTRY CONFERENCE. PROCEEDINGS. 1947. 280p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $3.00 25-B28-477.

PB 98115 Greathouse, Glenn A. ROLE OF THE PREVENTION OF DETERIORATION CENTER. 1949. 2p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98097 Hartley, Carl DETERIORATION OF WOOD AND WOOD PRODUCTS. 1949. 15p photos Mi $1.75, Ph $2.50 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D.C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98095 Jennison, Marshall W. and Henderson, Richard. SOME ASPECTS OF THE PHYSIOLOGY OF WOOD-ROTTING FUNGI. 1949. 11p Mi $1.75, Ph $2.50 (Limited supply free from U. S. Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D.C.). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98112 Kuenzel, John G. WOOD REQUIREMENTS FOR SHIPBUILDING. 1949. 20p photos, tables Mi $1.75, Ph $2.50 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98100 MacLean, J. D. RESULTS OF EXPERIMENTS ON THE EFFECTIVENESS OF VARIOUS PRESERVATIVES IN PROTECTING WOOD AGAINST MARINE-BORER ATTACK. 1949. 23p photos Mi $2.00, Ph $3.75 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98096 Nord, F. F. and Schubert, W. J. STUDIES ON LIGNIN AND THE MECHANISM OF LIGNIFICATION. 1949. 13p diagrs, graphs, tables Mi $1.75, Ph $2.50 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98117 NRC-ONR Symposium on Wood, Washington, D. C., 1949. WOOD; PROGRAM OF NRC-ONR SYMPOSIUM ON WOOD, JUN 16-17, 1949. 1949. 5p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.)

PB 97630 Phillips, E. W. J. IDENTIFICATION OF SOFTWOODS BY THEIR MICROSCOPIC STRUCTURE. 1948. 56p photos, map Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. Australia. Dept. of scientific and industrial research. Forest products research bulletin no. 22.

PB 98105 Proctor, Phimister B. WAXES AND TANNIN FROM DOUGLAS FIR BARK. 1949. 4p tables Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98101 Reed, William D. and Synder, Thomas E. DETERIORATION OF WOOD BY INSECTS. 1949. 14p photos Mi $1.75, Ph $2.50 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98099 Reid, David G. BALSA WOOD AS AN END-GRAIN CORE MATERIAL IN SANDWICH CONSTRUCTION. 1949. 23p photos, diagrs, table Mi $2.00, Ph $3.75 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98098 Royce, Clinton K. ANTICIPATED REQUIREMENTS FOR WOOD IN PACKAGING. 1949. 4p Mi $1.25, Ph $1.25 (Limited supply free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 97084 Schaffer, R. J. MANUFACTURE IN GERMANY OF BUILDING MATERIALS FROM WOOD-WASTE. Jun 1947. 102p photos, tables Mi $4.50, Ph $13.75 . German text by Hansjürgen Saechtling inserted between p. 53 and p. 54. (Micro BIOS DOC 3335/4510/8). For abridged translation of this report see p. 48-58. BIOS FR 1846, Item 22.

PB 98106 Schrader, O. Harry SOME STRENGTH PROPERTIES OF SECOND-GROWTH DOUGLAS FIR. 1949. 7p tables Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98108 Shoemaker, Tom L. RECENT DEVELOPMENTS IN IMPROVING THE MARINE BORER RESISTANCE OF LUMBER AND PLYWOOD USED IN PLANKING NAVAL VESSELS. 1949. 13p photos, table Mi $1.75, Ph $2.50 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98107 Shriner, Ralph L. STRUCTURAL RELATIONSHIPS OF CONSTITUENTS OF WOOD. 1949. 7p diagrs Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 97629 Smith, D. N. THE NATURAL DURABILITY OF TIMBER. 1949. 18p photo, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.20. Australia. Dept. of scientific and industrial research. Forest products research records no. 30. These tests consist of inserting specimens of standard size in the ground and recording the time taken for them to decay. Results, so far obtained, are given for about a hundred species, which have been put under test during the last 15 years. A tentative durability classification of these timbers has been prepared, and some suggestions are proposed for its practical application.

PB 98109 Smith, F. G. Walton A FUNDAMENTAL APPROACH TO THE MARINE BORER PROBLEM. 1949. 3p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98110 Stamm, Alfred J. IMPORTANCE OF CONVERSION PRODUCTS OF WOOD. 1949. 23p Mi $2.00, Ph $3.75 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98113 Stevens, J. M. REQUIREMENTS FOR WOOD IN MILITARY AIRCRAFT. 1949. 4p Mi $1.25, Ph $1.25 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98116 U. S. Office of Naval Research WOOD; A SUMMARY OF RESEARCH AND DEVELOPMENT PROJECTS IN WOOD SUPPORTED BY THE NATIONAL MILITARY ESTABLISHMENT. 1949. 23p Mi $2.00, Ph $3.75 (Limited supply available free from Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98094 Wangaard, Frederick F. TROPICAL WOODS RESEARCH AT YALE UNIVERSITY. 1949. 38p tables Mi $2.25, Ph $5.00 (Limited supply free from U. S. Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) Work conducted at the Yale School of Forestry in cooperation with the Office of Naval Research and Bureau of Ships under contract N6 ori-44, task order XV (Project NR-033-020). NRC-ONR symposium on wood, Jun 16-17, 1949.

PB 98114 Wilhelm, R. H. REQUIREMENTS FOR WOOD IN SPECIALIZED USES. 1949. 3p Mi $1.25, Ph $1.25 (Limited supply available free from

PB 98114 (Cont'd)
Office of Naval Research, Attention of Dr. Lewis Larrick, Code 423, Washington 25, D. C.) NRC-ONR symposium on wood, Jun 16-17, 1949.

MEDICAL RESEARCH AND PRACTICE

PB 97294 Dudley, Horace C. and others. SHIELDING OF SYRINGES USED FOR INJECTING RADIOACTIVE SOLUTIONS. Feb 1949. 4p drawings Mi $1.25 Ph $1.25.
The administration of radioactive materials both in experimental and clinical investigations provides hazards to the personnel making the injection thru total body radiation and particularly intense localized irradiation of the hands. Suitable syringe shields are described which have afforded adequate protection from both beta and gamma emitters. NMRI Proj NM 011013 R5.

PB 97295 Dudley, Horace C. and Levine, Milton D. STUDIES OF THE ACUTE TOXICITY OF GALLIUM. Jan 1949. 11p tables Mi $1.75, Ph $2.50.
The investigation includes acute and chronic toxicity, pharmacology, biochemistry and other phases of pertinent biological interest. The report gives the results of studies on the acute effects of single doses of gallium (a) by inhalation of an aerosol of the chloride, (b) by injection of the lactate, and (c) on the distribution of gallium in tissues of animals so injected. The report is divided into introduction, material and methods, results, and summary and conclusions. References and tables are attached. NMRI Proj NM 011013 R3.

PB 97292 Dudley, Horace C. and others. STUDIES OF THE METABOLISM OF GALLIUM. Jan 1949. 10p graphs, table Mi $1.25, Ph $1.25.
The excretion of gallium is predominantly via the urine, with 85 per cent or more of a near-toxic dose retained in the rabbit more than ten days. Retention in the liver and kidneys of the rat is moderate for up to 30 days, while bone retains large concentrations of the element for 90 days and longer. Gallium is transported wholly by the plasma, the initial concentration dropping rapidly so that at the end of 24 hours a concentration of less than 1 microgram Ga/ml. is reached. Formed elements show no significant change. It is postulated that gallium may offer a new approach to the study of bone metabolism. Gallium seems to act as a neuromuscular poison. NMRI Proj NM 011013 R4.

PB 97372 Fetcher, E. S. and others. SKIN TEMPERATURE AS AN INDEX OF BLOOD FLOW. Mar 1949. 7p graphs Mi $1.25, Ph $1.25.
Experiments and their results, with discussion, are given in the appendix. It is concluded that skin temper does not follow the blood flow changes in any detail unless the calculated heat loss rate from the part under investigation is more than about 240 K. Cal./hr./M^2. Three graphs are attached. AAF TSEAA MR 696-113S.

PB 97032 Hall, F. G. INTERVAL OF USEFUL CONSCIOUSNESS AT VARIOUS ALTITUDES. Jan 1949. 16p drawing, graphs, tables Mi $1.75, Ph $2.50.
In this investigation two different studies are reported. The first is a record of determinations of the intervals of useful consciousness at various altitudes

PB 97032 (Cont'd)
as a criterion of altitude tolerance. The second represents an attempt to induce an increased tolerance to altitude by raising the oxygen capacity of the blood by transfusion. In the method used the scoring is simple, end points are determined to within narrow limits, and permanent records are obtained. Bibliography, tables, diagram and graphs are attached. AAF TSEAA MR 696-107J.

PB 97300 Kuntz, Robert E. and others. SUSCEPTIBILITY OF GOLDEN HAMSTERS TO SCHISTOSOMA MANSONI. Feb 1949. 12p graphs, tables Mi $1.75, Ph $2.50.
An evaluation has been made of the golden hamster as a definitive host for Schistosoma mansoni. It was found to be an excellent host for the maintenance of the life cycle of the parasite in the laboratory and for the provision of great numbers of well-developed adult worms and viable ova for special investigations. It is suggested that the following precautions be taken to limit loss by death of the hamsters: infected hamsters be isolated to prevent fighting, the exposures be limited to 200 cercariae or less, and the duration of the infection be not more than ten weeks. No evidence of a natural host resistance to the infection was observed. NMRI Proj NM 005004 R21.

PB 97297 McAllister, William B., Jr. PATHOLOGY OF LOUSE-BORNE TYPHUS FEVER FROM THE EPIDEMIC OF 1943-1945 IN EGYPT. Jan 1949. 13p photos Mi $1.75, Ph $2.50.
Summary: (1) Forty-one fatal cases of louse-borne typhus fever form the basis of this report. (2) Interstitial pneumonia, very similar to that reported in two other rickettsial diseases as well as in other and unrelated conditions, becomes conspicuous when the usual complicating purulent pneumonia is suppressed by antibiotic therapy. (3) Fibrinoid necrosis of the walls of arteries and arterioles is a usual finding when death occurs during the third week of typhus fever. The clinical importance of this lesion is discussed. (4) Endothelial origin is suggested for the perivascular accumulations of mononuclear cells, a characteristic of the lesions of many organs when death occurs before the fourteenth or fifteenth day. (5) Treatment with para-aminobenzoic acid (Paba) in two cases, did not result in modification of the anatomical manifestations of the disease. References and 10 photomicrographs are attached. NMRI Proj NM 007017 R1.

PB 97293 Minard, David and Howell, S. R. MODIFIED PROCEDURE FOR THE PREPARATION OF THE LUCITE CALVARIUM IN MONKEYS. Feb 1949. 35p photos, drawings Mi $2.25, Ph $5.00.
Leakage of cerebrospinal fluid is the chief problem encountered in the preparation of monkeys with the lucite calvarium. To insure against such leakage the two-stage operation originally described by Pudenz, Shelden, and Restarski has been modified by the present authors into a four-stage procedure. In the first stage an impression is taken of the intact skull. From this impression is fabricated a grooved ring of ticonium metal which is implanted on the skull in the second operation. After an interval of several weeks, to permit any small spaces between the ring and skull to be filled in with fibrous tissue, the bony calvarium is removed in the area confined by the ring. The dura remains

intact. A second impression taken at this time is used in the fabrication of the lucite plate which, when completed, is bolted and cemented to the metal ring after removing the dura in the final operation. In the absence of leakage, inflammatory reactions which are manifested by clouding, fibrin deposition and exudate formation may not occur for long periods. Instead a slow ingrowth of tissue from the cut edge of the dura is observed with later appearance of bone regeneration in some areas. The calvarium is so designed that removal and replacement are possible under aseptic conditions, thus extending its range of experimental application. NMRI Proj NM 013012 R3.

PB 97301 Vollmer, E. P. and Samsell, J. E. FAILURE OF ADRENOCORTICAL EXTRACT TO MODIFY THE IMMUNITY ACQUIRED BY INTACT MICE THROUGH THE USE OF PNEUMOCOCCAL VACCINE. Mar 1949. 9p Mi $1.25, Ph $1.25.
The influence of adrenocortical function upon the level of circulating antibodies, as determined by serological means, has been the subject of contradictory reports. To secure an independent check, mice were treated with adrenocortical extract or control substances at the time of immunization with pneumococcal vaccine, and later challenged with living pneumococci. The treatments had no effect upon mortality rates, indicating that in intact, uninfected mice an excess of adrenocortical hormone administered early in the immunization period did not increase resistance to the infection. NMRI Proj NM 007024 R5.

PB 97034 Wood, John A. and Sweeney, Henry M. SOME AERO MEDICAL PROBLEMS IN B-36 AIRCRAFT. Feb 1949. 9p Mi $1.25, Ph $1.25.
Problems originating as a result of flights to 40,000 feet and those anticipated up to 50,000 feet are discussed in three appendices. Conclusions and recommendations are given. AAF TSEAA MR 696-108A.

PB 97274 Wood, John A. SOME AERO MEDICAL PROBLEMS IN B-36 AIRCRAFT - ADDENDUM I. Mar 1949. 2p Mi $1.25, Ph $1.25.
A progress report on the development of masks, flying suits and other aeromedical equipment for use in B-36 airplanes. AAF TSEAA MR 696-108B.

METALS AND METAL PRODUCTS

PB 97764 American Iron and Steel Institute, New York City, N. Y. POSSIBLE SUBSTITUTES FOR NICKEL STEELS. May 1941. 80p pilots, graphs, tables Mi $3.50, Ph $10.00.
This report deals with constructional steels containing not more than the following percentages of the given elements: Cr 1.50, Ni 5.25, Mo 0.75, Mn 2.00, and V 0.20. The effects of these alloying elements have been recorded systematically in order to present possible substitutes for nickel steels. In order to successfully substitute for a given grade of nickel steel, careful consideration must be given to the physical properties and heat treatment characteristics. The selection and application of constructional alloy steels are seldom dependent upon tensile properties alone; it is usually a compromise involving many factors. Size of section is of prime importance and in some cases the effect

PB 97764 (Cont'd)
of nickel in large crystals is difficult to duplicate. Substitution may involve changes in fabricating methods, heat-treatment procedures and facilities for its control.

PB 97812 Bentley, Foster S. THE CHLORINATION OF AZ 63 MAGNESIUM CASTING ALLOY. Jul 1946. 8p drawing, table Mi $1.25, Ph $1.25.
Chlorination of AZ63 magnesium alloy will reduce the severity of microporosity normally encountered in its castings. The replacement of the usual refining process (stirring melt while sprinkling Dow 310 flux on the surface) by chlorination will produce castings of at least equal cleanliness. The temperature of chlorination, over the range of 1300-1450°F is immaterial so far as reduction of microporosity is concerned and a practical method consists of chlorinating the melt over the temperature range 1300-1450°F, as the metal is being heated to the superheating range for grain refinement. Chlorination with a normal chlorinating procedure for five minutes produced substantially all the benefits observed when melting and casting 55 lbs of magnesium alloy. An additional five minutes produced a very light improvement, however, it is desirable to insure optimum and dependable results.

PB 98038 Fowler, Franklin H. THEORIES OF THE FATIGUE OF METALS. May 1948. 46p graphs Mi $2.50, Ph $6.25. U. S. Office of Naval Research, Dynamic properties of materials, Technical report no. 1.

PB 97647 Fricke, R. PRIMÄR-, SEKUNDÄR- UND REALSTRUKTUR FESTER STOFFE. (PRIMARY, SECONDARY AND CRYSTALLINE STRUCTURE OF SOLIDS). 1949. 17p tables (Text in German) Mi $1.75, Ph $2.50. Chalmers University of Technology, Gothenburg, Sweden. Transactions, no. 82.
A study of the chemical affirmity of various substances, including ideal and deformed ion formation, valence, metallic compounds, and the structure of atomic and molecular groups.

PB 97854 Hall, T. H. and others. LIGHT ALLOY FOUNDRIES IN GERMANY. Aug 1945. 185p photos, drawings, tables Mi $6.75, Ph $23.75. BIOS Fr 1861, Item 21.

PB 96898 Hoog, H. ADDITIONAL INFORMATION ON VARIOUS CATALYTIC PROCESSES IN WESTERN GERMANY. II. FRENCH, U. S. AND BRITISH ZONES. Jun 1947. 90p photos, diagrs, tables Mi $3.75, Ph $11.25.
For the same reasons as stated in the introduction to BIOS/Misc no. 112 (PB 96550) dealing with additional information on catalytic processes in Germany, a trip was made from May 18 - Jun 5, 1947 and the information collected is described in this report. The material is arranged according to the processes studied rather than according to the plants or institutes visited and coversL (I) Fischer-Tropsch Synthesis, (II) Formylation Process (oxo-process), and III Preparation of Hydrogenation Catalysts. The report is in English. Addendum I, II, and III are in German. Photographs and drawings are included. BIOS M113.

PB 97740 International Nickel Co., Inc., New York, N. Y. MONEL, INCONEL, NICKEL, AND NICKEL ALLOYS. 1947. 508p photos, diagrs, graphs, tables Mi $9.00, Ph $63.75.
Data on the mechanical, chemical and physical characteristics of commercial forms of nickel, and certain of its alloys which are known under the following trade names are given: Wrought Products Monel, "R" Monel, "K" Monel, Nickel, "L" Monel, "Z" Monel, "D" Monel, Inconel, Monel-clad steel, Nickel-clad steel, Inconel-clad steel; Cast Products - Monel, "H" Monel, "S" Monel, Nickel, Inconel. In addition, the chemical composition, chemical analyses and tests corrosion resistance, physical constants (electrical, magnetic, physical, and thermal properties), mechanical properties, mechanical properties of wrought special high-nickel alloys and clad materials, special mechanical properties, mechanical properties at elevated temperatures and at low temperatures, metallographic examination and X-ray diffraction analysis, working instruction, heat transfer through metallic walls, and castings are discussed.

PB 97726 Klier, E. P. and others. CORRELATION OF LABORATORY TESTS WITH FULL SCALE SHIP PLATE FRACTURE TESTS: STUDY OF STRAIN GRADIENTS. PROGRESS REPORT. Jun 1949. 82p photos, drawings, graphs Mi $3.75, Ph $11.25.
A study of the characteristics of the strain gradient of brittle factures and the ductile fractures. Strain gradients normal to fracture surfaces were determined. These fracture surfaces were developed under the following conditions of tests: (1) V-notch Charpy bars broken by impact at various locations within the transition zone, (2) V-notch Charpy bars bent, but not completely broken, by impact above the transition temperature, (3) slow bend Schnadt type bars broken below the transition temperature, and (4) 72-inch wide, center notch, tensile specimens broken with ductile and brittle behavior. The strain gradients were studied by means of hardness tests, metallographic methods and X-ray analysis. It is concluded that true cleavage separation is not accompanied by a measurable strain gradient but most "brittle" or "cleavage" fractures, so classified on the basis of gross appearance, contain some areas separated by a shear mechanism. NRC SSC 17.

PB 97921 Kutar, P. H. IRON AND STEEL WORKS IN GERMANY. Sep 1946. 92p Mi $4.25, Ph $12.50. BIOS FR 1850, Item no. 21.

PB 97924 Levy, S. I. EXTRACTION OF COPPER AND OTHER METALS FROM PYRITES CINDER. Mar 1946. 29p tables Mi $2.00, Ph $3.75. BIOS FR 496, Item no. 21.

PB 97848 Lucks, C. F. ADVISORY REPORT ON TEST METHODS OF THE MATERIALS LABORATORY; ENGINEERING DIVISION, AIR TECHNICAL SERVICE COMMAND, WRIGHT FIELD, DAYTON, OHIO PART II. TEST METHODS OF THE METALLURGICAL BRANCH. Sep 1945. 62p photos, drawings Mi $3.00 Ph $8.75. OSRD 5537.

PB 97795 Perimutter, I. TENSILE PROPERTIES OF SOME HEAT RESISTANT SHEET ALLOYS AT ELEVATED TEMPERATURE. Dec 1946. 14p tables Mi $1.75, Ph $2.50.
Tests were conducted to determine the tensile properties of the alloys S-816, Inconel B, and Inconel X in sheet form at elevated temperatures. Tests were conducted on the material in the air-cooled condition (1 hr at test temperature) and on specimens aged 48 hr at testing temperatures. Up to 1200°F the duplicate values of tensile strength are reasonably consistent and indicate the trend with respect to temperature up to that point. It is concluded that the S-816 sheet material used in the tests was very nonuniform, consequently yielding erratic results which cannot be considered as representative of the alloy in the sheet form. The tensile and yield strengths of unaged Inconel B material at elevated temperatures are somewhat superior to those of standard Inconel. However, after aging for 48 hr at testing temperatures, Inconel B exhibits lower tensile strength than standard Inconel at temperatures of 1200°F to 1500°F.

PB 97955 Roth, W. SCATTERING OF ULTRASONIC RADIATION IN POLYCRYSTALLINE METALS. Nov 1947. 21p photo, diagrs, graphs, tables Mi $2.00, Ph $3.75. Part of thesis, Mass. Institute of Technology, 1947.
A method is described for measuring absorption and velocity of ultrasonic radiation in the frequency range from 5 to 100 megacycles by the use of pulse techniques. Results of such measurements performed on polycrystalline magnesium and aluminum as a function of frequency and grain size show that the absorption coefficient varies linearly with frequency, and inversely with grain size. The scattering power of a metal, and the fidelity with which an ultrasonic pulse is transmitted are shown to depend on the elastic constants of the single crystals. Criteria are established for evaluating the fidelity of pulse transmission in cubic and hexagonal metals, and figures of merit are given for many such polycrystalline metals.

PB 97648 Schwab, Georg-Maria KATALYSATOREN IN THEORIE UND PRAXIS. (CATALYSTS IN THEORY AND PRACTICE). 1949. 33p drawings, graphs (Text in German) Mi $2.25, Ph $5.00. Chalmers University of Technology, Gothenburg, Sweden. Transactions, no. 81.
A study of the action of heterogeneous catalysts, including the material effect and a discussion of the theory of the material effect, metallic strength, the metallographic problem, the absolute speed and catalytic selectivity.

PB 97725 Sims, C. E. and others. METALLURGICAL QUALITY OF STEELS USED FOR HULL CONSTRUCTION. FINAL PROGRESS REPORT. May 1949. 116p graphs, tables Mi $4.75, Ph $15.00.
A study of the mechanical properties obtained by the addition of various combinations of manganese, molybdenum, vanadium, aluminum, nickel and copper. NRC SSC-25.

PB 97724 Sims, C. E. and others. METALLURGICAL QUALITY OF STEELS USED FOR HULL CONSTRUCTION. FINAL AND SUMMARY REPORT. Jun 1949. 128p photos, graphs, tables Mi $5.00, Ph $16.25.

PB 97724 (Cont'd)
A study of high tensile plate steel used in construction of welded ship hulls, primarily with reference to their welding properties. NRC SSC-26.

PB 97669 Thomas, O. and Watkins, G. A. IRON ORE PREPARATION. THE ROBINS-MESSITER SYSTEM OF ORE BLENDING AT THE ORE PREPARATION PLANT AT HERMANN GOERING STEEL WORKS, WATENSTEDT, SALZGITTER. Jun 1946. 13p Mi $1.75, Ph $2.50, Mimeo: $.50. BIOS FR 1857, Item no. 21.

PB 97793 Titorchook, W. H. and Fostor, L. S. POWER METALLURGY - A VACUUM HEATING, MELTING AND SINTERING FURNACE, ITS CONSTRUCTION, OPERATION AND MAINTENANCE. Apr 1947. 35p photos, drawings, graphs, tables Mi $2.25, Ph $5.00.
Furnace for melting small charges of metals, as well as for sintering powdered metal products under high vacuum, is described. Main components of equipment are power source with 20-kw motor generator set, inductor coil consisting of 20 ft 1/4 in. standard weight copper pipe wound into 5-1/2 turn coil, vacuum chamber and manifold of stainless steel, diffusion pump used as vacuum booster pump of 1250 cu ft per min capacity at 2 microns pressure, and dual chamber type dryer with a reactivating system. WALR 671/61.

PB 97794 Wain, H. L. PROPERTIES OF SINTERED BRONZE; INFLUENCE OF COMPACTING PRESSURE, TEMPERATURE OF HEAT TREATMENT AND TIME OF HEAT TREATMENT. Jan 1946. 57p photos, graphs, tables Mi $2.75, Ph $7.50.
Study is presented of the influence of some processing variables on the properties of sintered bronze manufactured according to the power metallurgy method. Variables considered were compacting pressure, temperature of heat treatment, and time of heat treatment. It was found that an increase in compacting pressure at room temperature caused a general consolidation of the powder mass. At heat treatment temperatures up to 700°C, there was definite progress in crystal recovery, recrystallization, and grain growth. AUS CSIR DA SM-61.

PB 93018 Wiener, H. DEVELOPMENT OF SINTERED CARBON STEELS AND THEIR USES. n.d. 6f (Text in German and English) Mi $1.25, Enl Pr $2.50. Micro BIOS FD 700/48, Frames 1-6. No abstract available.

MINERALS AND MINERAL PRODUCTS

PB 97772 Dean, R. S. and Silkes, B. METALLIC TITANIUM AND ITS ALLOYS. Nov 1946. 38p drawings, graphs, tables Mi $2.25, Ph $5.00.
This manual contains a comprehensive outline of the technology of titanium, including a list of existing reference literature. The following phases are covered: Sources and availability, preparation of the metal, preparation of ductile titanium, powder metallurgy and properties of ductile titanium, uses of ductile titanium, and alloys of titanium. Research carried on by U. S. Bureau of Mines.

PB 97767 Droher, Joseph J. NEPA 722-EMR-33 TITANIUM. Aug 1948. 127p graphs, tables Mi $5.00, Ph $16.25.
As the first member of Group IV-A, which includes zirconium and hafnium, titanium possesses many interesting properties. It is a light, strong, corrosion-resistant metal; thus combining the properties of stainless steel with those of the strong aluminum alloys. Since titanium can be surface-hardened it has a definite advantage over the light metals in the construction of parts subject to frictional wear. Titanium also has the unusual property of marking glass, besides having low thermal conductivity, a coefficient of expansion less than that of cast iron, a low modulus, and a high melting point. Chemically, titanium is very resistant to acids; it alloys readily with most of the metals. It forms oxides and extremely hard nitrides and carbides of a refractory nature; it burns in air and is the only element known which burns in nitrogen. Titanium is also unique in that it will appear in colloidal form in solutions containing large amounts of electrolytes.

PB 97779 Du Mont, Charles S. BIBLIOGRAPHY ON TITANIUM, ITS PRODUCTION, PROPERTIES AND USES (1900-1946). 1947. 180p Mi $6.50, Ph $22.50.
A bibliography is compiled dealing with the production, properties, and uses of titanium. The following topics are discussed in detail: physical properties of titanium, the metallurgy and production of pure titanium, the production and uses of titanium alloys as addition agents, smelting titaniferous ore, titanium as an alloying element in steel, titanium in cast iron alloys containing titanium and aluminum, titanium-copper alloys, production of titanium carbides and nitrides, titanium containing nonferrous alloys, equilibrium diagrams for various titanium alloy systems, chemical method for analysis, photometric and spectral analysis, uses of titanium and its compounds in chemical reactions, chemistry of titanium and its compounds, physical and chemical properties of its dioxide, uses in various ceramic bodies, titanium in medicine, and the titanium arc. Prepared by Battelle Memorial Institute, Columbus, Ohio.

PB 97199 Edward, P. J. and others. SOME ASPECTS OF THE GERMAN GLASS INDUSTRY IN 1946. n.d. 80p drawings, tables Mi $3.50, Ph $10.00 BIOS FR 1822, Item 31.

PB 97628 Houston, Harry H. and Morgan, Ralph A. LIME ROCK IN CONCRETE. PART I. METHOD FOR MIXING AND PLACING CONCRETE USING SOFT FLORIDA LIME ROCK AS AGGREGATE. Jun 1944. 36p Available free from Florida. University. Engineering and Industrial Experiment Station, Gainesville, Fla. Florida. University. Engineering and Industrial Experiment Station. Bulletin no. 7.

PB 97954 Litton, F. B. ZIRCONIUM ALLOY PROJECT. CONTRACT NO. W-33-038 AC 20168. REPORT NO. 6. Dec 1948. 10p Mi $1.25, Ph $1.25.
The hot workability of Zr-Al and Zr-Ta-Al alloy were investigated at 900°C. Preliminary tensile properties of Zr-Ti and Zr-Ti-Al showed that these alloys possessed high strength which could be improved by heat-treatment. The preparation of 0.10 Hf containing Zr and the preparation of relatively pure hafnia was continued. Concentrating unit for the latter has been installed which is

PB 97954 (Cont'd)
capable of handling 500 gallons of starting solution. Chlorination runs on Zr oxide ore are reported. Sublimation apparatus was set-up and about 20 lbs $ZrCl_4$ containing 0.8% Hf were sublimed under hydrogen preliminary to producing iodine metal. Research carried on by Foote Mineral Co., Philadelphia, Pa.

PB 96589 Studiengesellschaft Hartmetall, Berlin PURIFICATION OF WASTE DIAMOND DUST. REMOVAL OF IMPURITIES FROM DIAMOND DUST BY HEATING IN AN AIR CURRENT. 1947. 13f Mi $1.75, Enl Pr $3.75. Micro BIOS FD 3744/47, Frames 1-12.

PB 97195 Trapp, G. J. and others. INTERROGATION OF DR. REINER CHELIUS OF FRIEDRICH KRUPP A. G., ESSEN WITH THE ANALYSIS OF SYNTHETIC CARBIDE MATERIALS AND COMPONENTS USED IN THEIR MANUFACTURE. Mar 1948. 46p diagrs, tables Mi $2.50, Ph $6.25. BIOS FR 1853, Item 21.

PB 97627 Tyner, Mack EFFECT OF MOISTURE ON THERMAL CONDUCTIVITY OF LIMEROCK CONCRETE. Aug 1946. 10p diagrs, graph, table Available free from Florida. University. Engineering and Industrial Experiment Station, Gainesville, Fla. Florida. University Engineering and Industrial Experiment Station. Technical paper no. 12.
The coefficient of thermal conductivity, k, of limerock concrete is a function of temperature, composition and density or moisture content. No attempt has been made to measure the effect of temperature on k. Holding the temperature reasonably constant, the effect of composition on k has been measured for two limerock concrete mixes (1:5 and 1:7 by volume). The 1:5 mix has a k that is 10 percent larger than the k for the 1:7 mix. With the temperature and composition held constant, the effect of moisture on k for the 1:5 and 1:7 mixes has been measured. The moisture content has a very profound effect on k, e.g. increases of moisture from zero to 5 percent increases the k of 1:5 mix by 23 percent and from zero to 10 percent increases the k by 46 percent. Concretes should be kept dry if their maximum heat insulation effect is desired.

PB 97745 U. S. Bureau of Mines. Southern Experiment Station, Tuscaloosa, Ala. Metallurgical Div. METHODS USED IN EVALUATING ADSORBENT CLAYS. Sep 1948. 39p drawings, diagrs, graphs Mi $2.25, Ph $5.00.
A survey of methods employed in testing clays for their oil-clarifying or bleaching capacities is outlined. The procedures and apparatus accepted as standard by the industry are described together with other methods that have been found particularly suitable for use in the clay laboratory. It was found that the oil industry and the producers of absorbent clays usually employ one of the two methods for testing bleaching qualities. The two methods were developed from the two different procedures, "percolation" and "contact", which the oil industry employs in clarifying its oil stocks. The test methods, adjusted to the process and oil stock used in the refinery, are laboratory duplications of the clarification conditions. BM IC 7475.

PB 97796 Crittenden, E. C. and others. PHYSICS OF SURFACES. PERIODIC STATUS REPORT MAR 1, 1948. Mar 1948. 7p Mi $1.25, Ph $1.25. Case Institute of Technology, Cleveland, O. Dept. of Physics.
A periodic status report is given on research done on magnetic properties of thin films of cobalt, the magnetic analyzer for thin ferromagnetic films, and crystal structure of thin films of cobalt. It has been verified that the magnetic properties of these films are very dependent on film thickness and also on the temperatures of the surface being coated. The hysteresis loops for about 200 different cobalt samples have been photographed for future comparison. A new coil system for the analyzer which will permit temperature control from -180°C to 200°C of the specimen whose magnetic properties are being studied is nearing completion. The magnetic analyzer has been used successfully to determine the magnetic properties of copper-iron alloys. Research carried on at Case Institute of Technology, Cleveland, Ohio.

PB 97703s2 Gordy, Walter MICROWAVE ABSORPTION SPECTRA OF GASES. REPORT FOR THE PERIOD JAN 1, 1947-FEB 1, 1947. Feb 1947. 10p diagrs Mi $1.25, Ph $1.25. Duke University, Durham, N. C. Dept. of Physics. Monthly report no. 8. Sponsored by Watson Laboratories, Air Materiel Command, U. S. Army Air Forces.
Work during this monthly report period was concerned with the development of instruments and techniques for the measurement of microwave absorption of gases, and with the acquisition of experience in such measurements. To assist in this, the ammonia lines in the K band region already published by others were measured. For measurements of gases that have relatively strong absorption lines like those of ammonia, the frequency modulated source with the spectral lines displayed on a cathode ray scope was highly satisfactory.

PB 97703 Gordy, Walter MICROWAVE ABSORPTION SPECTRA OF GASES. REPORT FOR THE PERIOD MAY 1947 to JUNE 1, 1947. Jun 1947. 15p diagrs Mi $1.75, Ph $2.50. Duke University, Durham, N. C. Dept. of Physics. Monthly report no. 12. Sponsored by Watson Laboratories, Air Materiel Command, U. S. Army Air Forces.
The microwave spectra of $Br^{79}CN$, $Br^{81}CN$, ICN, and CH_3I were measured in the region of 9 to 10 mm. Hyperfine structure caused by interaction of the nuclear quadrupole moment with the molecular fields was observed for each of the molecules. The data on these molecules are completely analyzed and the results are given. The J = 2 to J = 3 transitions of $Cl^{35}CN$ and $Cl^{37}CN$ which fall in the region of 8.4 mm were measured, and the hyperfine structure caused by the nuclear quadrupole moment of nitrogen as well as that of chlorine was resolved. Development work was being done on a molecular stabilizer for microwave oscillators.

PB 97703s3 Gordy, Walter MICROWAVE ABSORPTION SPECTRA OF GASES. REPORT FOR THE PERIOD JUL 1, 1947-AUG 1, 1947. Aug 1947. 8p Mi $1.25, Ph $1.25. Duke University, Durham, N. C. Dept. of Physics. Report no. 14. Sponsored by Watson Laboratories, Air Materiel Command, U.S. Army Air

PB 97703s3 (Cont'd)
Forces.
The J=O to J=1 to J=2 rotational transitions of methyl cyanide and methyl isocyanide were measured. From these measurements, calculations were made of the moments of inertia about axes perpendicular to the symmetry axes. Studies were also made of ammonium fluoride and ammonia. The progress made on the system for multiplying to the millimeter region the standard frequencies broadcast by station WWV of the Bureau of Standards is discussed. These frequencies will be used for the accurate measurement of frequencies in the millimeter region. An absorption cell for the spectrum line stabilizer for the K-band region was constructed from X-band wave guide. More effective stabilization was obtained with the X-band guide as a cell, although more troublesome reflections were encountered.

PB 97703s Gordy, Walter MICROWAVE ABSORPTION SPECTRA OF GASES. REPORT FOR THE PERIOD AUG 1, 1947-SEP 1, 1947. Sep 1947. 15p photos, diagr Mi $1.75, Ph $2.50. Duke University, Durham, N. C. Dept. of Physics. Report no. 15. Sponsored by Watson Laboratories, Air Materiel Command, U. S. Army Air Forces.
A method was developed for putting sharp pip-markers on a cathode-ray scope for measuring accurately the frequency separations of the hyperfine structure in the microwave spectra of molecules. Using this method, accurate measurements of the separations of the hyperfine structure in the J=O to J=1 transition of methyl cyanide were made, and from these measurements the nuclear quadrupole coupling coefficient was calculated. From the measurements of the microwave spectra, the moments of inertia of these molecules were determined. The spectrums of ammonium fluoride, ozone, and ammonia have been investigated and are briefly reported. Detailed reports on the microwave spectrum frequency markers and the microwave spectra of methyl cyanide and methyl isocyanide are included.

PB 97777 Gordy, Walter MICROWAVE ABSORPTION SPECTRA OF GASES. Oct 1947. 8p photo Mi $1.25, Ph $1.25.
A spectrum line discriminator was developed for stabilizing microwave oscillators with the natural frequencies of molecules in the gaseous state. Using this discriminator, K-band oscillators were stabilized by tying them electrically to certain frequencies of ammonia molecules. Systems for measuring the absorption of gases or vapors in the region of 5 to 17 mm were built, and a convenient method was developed for measuring accurately small frequency differences in the microwave region. The method is useful in measuring line separations in the hyperfine structure of microwave spectra, measuring absorption line widths, or determining the Q of high Q cavities. Hyperfine structure, cause by nuclear quadrupole moments of N, Br, Cl, and I, was observed in the spectra of molecules. From the analysis of results, both nuclear and molecular information was obtained.

PB 97708 Herlin, Melvin A. and Brown, Sanborn C. BREAKDOWN OF A GAS AT MICROWAVE FREQUENCIES. May 1948. 9p diagr, graphs Mi $1.25, Ph $1.25

PB 97708 (Cont'd)
The criterion for breakdown of low-pressure gas at microwave frequencies is established. This criterion is that ionization by collision of electrons with neutral gas molecules replaces loss by diffusion to the walls of the discharge tube. Mathematically expressed as a simple boundary value problem, this breakdown principle is applied to converting microwave breakdown measurements into measurements of ionization rates as a function of the electric field strength, pressure, and frequency. The energy transfer from the electric field to the electrons at a given E/p, where E is the electric field strength and p is the pressure, is shown to be most efficient when pressure is high enough or frequency low enough to result in many collisions of electrons with gas molecules per cycle. MIT RLE TR 60.

PB 97702 Karle, J. and Brockway, L. O. INTERPRETATION OF ELECTRON DIFFRACTION PATTERNS FROM HYDROCARBON FILMS. Feb 1947. 28p photos, diagrs, graphs Mi $2.00, Ph $3.75.
The theoretical expressions previously derived for the scattering of electrons by oriented hydrocarbon chains have been extended and applied to the calculation of characteristic diffraction patterns. These patterns are analyzed to form a basis for obtaining information about the molecular orientation. For the long chain molecules, the azimuthal direction and the declination from the vertical may be determined independently. The orientation of the hydrocarbon chain about its own axis is less easily established, since it is determined only from the intensity distribution within the separate diffraction orders. When the declination is sufficiently large, randomness in the azimuthal directions is distinguished by the crossed line pattern obtained. Randomness in the declination from the vertical may be estimated from the irregular spacing of the intercepts of the crossed lines. Quantitative intensity data would permit a more precise study of the angular distribution of the declination and also of the orientation of the hydrocarbon chain about its own axis. NRL H-3021.

PB 97722 Levine, Harold and Schwinger, Julian ON THE THEORY OF DIFFRACTION BY AN APERTURE IN AN INFINITE PLANE SCREEN. PT. I. Jun 1948. 17p Mi $1.75, Ph $2.50. U. S. Office of Naval Research. Contract N5 ORI-76. Task order no. I. NR-078-011. Technical report no. 54 part I. Reprinted from Physical review, v. 74, no. 8, p. 958-974, Oct 15, 1948.
Numerical results of the variational and other calculations are compared with the exact values obtained for this problem by Bouwkamp. In addition, the extent to which the two variational principles complement (and agree with) each other for the entire range of frequencies provides a general estimate of their accuracy.

PB 97730 Stephenson, S. T. RESEARCH IN THE VACUUM X-RAY REGION FROM 3 TO 20 ANGSTROMS. PROGRESS REPORT, JUL 1-SEP 30, 1947. Sep 1947. 4p Mi $1.25, Ph $1.25. Washington State College. Dept. of Physics Contract no. N-6-ORI-167. Task order no. II.
Data on the continuous spectrum of W, Cu, and Al are being reduced and corrected for back-ground, counter efficiency, window absorption, and plurality

of orders. Geiger counters having windows of Al only 0.0003 in. thick have been constructed and are in use. With the new counters, runs are now being made at voltages of 2.5 and 1.5 kv extended out to 13A.

RUBBER AND RUBBER PRODUCTS

PB 97737 Anderson, S. L. USE OF BUNDLES OF RUBBER THREADS AS ELASTIC RESTRAINT CORDS. Jan 1947. 11p graphs, tables Mi $1.75, Ph $2.50. Gt. Brit. Research and Development Establishment, Cordington. R-C/R-23.
A survey of previous work shows how the tension exerted by rubber threads depends critically upon extension, elastic history, temperature and time maintained at extension. A statement of the desirable requirements for restraint cords in expanding rubber balloons is then made. This leads to the formulation of a series of laboratory tests from the results of which the best available rubber may be chose. A further test on the selected rubber is then described which enables the extreme tensions likely to be exerted under the given conditions to be forecast. Finally the effects of several kinds of ageing on the physical properties of the rubber are described.

PB 97519 Derksen, J. C. and others. VISIT TO I. G. FARBENINDUSTRIE, LEVERKUSEN. Feb 1947. 47p Mi $2.50, Ph $6.25 Appendix pp 34-47 is in German.
Supplementary information concerning installations and products at I. G. Farbenindustrie plant at Leverkusen. A series of special treatises designed to supplement information previously covered in British and American Reports (In English but supplement, pp. 34-47 in German). Subjects include: polymerization of synthetic rubbers, properties and testing methods, synthetic latex, isocyanates, and chlorinated rubbers. TOR 28.

PB 97806 Orth (Dr.) POLYMERISATION VON 93% IGEM UND 85% IGEM BUTADIEN ZU PLASTIKATOR 32. (POLYMERIZATION OF 93% AND 85% BUTADIENE TO PLASTIKATOR 32 - PLASTIZER CONTAINING SODIUM POLYMERIZED BUTADIENE). 1944. 7p graphs, tables (Text in German and English) Mi $1.25, Ph $1.25. Translated by Polamold Research Laboratories, Inc., Springfield, O.
Polymerization experiments were conducted to determine the polymerization of 93% and 85% butadiene with plasticator 32. A dilution of the butadiene with residual gases does not cause a retardation in the start of the polymerization. For a 90% hydrocarbon, the polymerization of a butadiene dilution with residual gases is calculated to yield 170 T permonth of plasticator 32. The situation is more difficult for a 80% to 85% butadiene, because of the longer run time and the smaller yield per charge. Further experiments were conducted to show whether this could be compensated for by increasing the charge per autoclave from 1800 kg to 2250 kg.

PB 97809 Schaich (Dr.) BERICHT ÜBER MISCHKOAGULATE AUS BUNA S UND AKTIVEM GASRUSS (COAGULATES OF CARBON BLACK AND BUNA S). Sep 1938. 14p tables Mi $1.75, Ph $2.50.
A method was developed to produce mixed coagulates of Buna S and carbon black from the latex during milling, resulting in a considerable saving of time and energy. Coagulation reduced by one-half the necessary milling time for preparing the mixture even when using thermal break down methods, which had already cut down the time and energy requirements for the usual mixture procedures. Since experimental runs with these mixtures have shown test results equal to those of the usual materials, possibilities for carrying out this process on a commercial scale should be investigated further.

PB 97811 Scheurle, Bruno VERFAHREN ZUR SCHWEFELFREIEN VULKANISATION VON KÜNSTLICHEM KAUTSCHUK (METHOD OF VULCANIZING SYNTHETIC RUBBER). Oct 1944. 14p tables (Text in German and English) Mi $1.75, Ph $2.50.
A vulcanization method of synthetic rubber, without additions of sulfur, characterized by the application of thiazyl disulfides or its derivatives as a vulcanizer, is discussed. Copolymers of butadiene and acrylonitrile or styrene were vulcanized with dibenzothiazyl disulfide at temperatures from 150°-180°C. The properties of each copolymer tested and tabulated were strength, elongation, elasticity and hardness. The resulting vulcanizates were found to possess a certain degree of aging resistance. Perbunane vulcanized with dibenzothiazyl produced a synthetic rubber of satisfactory mechanical properties. A patent application for this vulcanization method has been made.

PB 97019 Smithson, J. A. and Whittorn, R. H. GERMAN TYRE AND BELTING PLANTS. May 1947. 19p Mi $1.75, Ph $2.50. BIOS FR 1832, Item 31.

PB 97566 Warner, A. J. and Chodos, A. CHLORINATED ALPHA-METHYL-STYRENE (AMS) DIMER. Jul 1948. 5p tables Mi $1.25, Ph $1.25. Federal Telecommunication Laboratories, Inc., Technical memorandum no. 321. Dielectric Laboratory 28-TC.
The preparation of the solid Alpha-Methyl-Styrene dimer and its subsequent chlorination were described. The object of the work was to prepare an ample amount of chlorinated alpha-methyl-styrene for the development of feasible methods for its purification and subsequent evaluation. The procedure is given in detail beginning with treatment of the required amount of monomer. End products are filtered off, crystallized and fractionated under reduced pressure.

PB 97562 Warner, A. J. and Kaganoff, S. CHLORINATED ALPHA-METHYL-STYRENE (AMS) DIMER. Jul 1948. 8p tables Mi $1.25, Ph $1.25.
Tests were conducted to determine the yields and characteristics of chlorinated alpha-methyl-styrene solid dimer fractions and to get comprehensive data on various methods of purification of chlorinated AMS dimer. Small amounts of chlorinated dimer were treated with activated floridin by varying the amount of the latter, the temperature and duration of heating. As a results of these experiments the following procedure was worked out: Crude chlorinated dimer is heated with 2% activated floridin at a temperature of 100°-150°C for two hr

PB 97562 (Cont'd)
under constant stirring. The product is then passed under reduced pressure through a heated chromatographic column containing activated floridine. By using this treatment, the product is freed from solid impurities and the color becomes considerably lighter. Originating agency: Federal Telecommunication Laboratories, Inc. Dielectric Laboratory, Nutley, N. J.

TEXTILES AND TEXTILE PRODUCTS

PB 97637 Glaskin, A. A STATISTICAL NOTE ON THE VARIATION OF POROSITY OF NYLON FABRIC TO SPECIFICATION D.T.D. 556 A. Jun 1945. 12p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90.
A large number of high-pressure porosity measurements have been made on Twill and Plain Weave Nylon samples and it has been found that, in general, the porosity across the width of a piece of fabric, along a line parallel to the weft threads, increases from a minimum value at the selvedge to a maximum at the center of the width. The difference between these minimum and maximum values are large compared with the overall range of porosity for the fabric. The variation is such that the mean porosity at a distance of 9 inches from the selvedge is very close to the overall mean porosity. The variation of porosity along the length of a piece of fabric, at a constant distance from the selvedge, is very nearly the same at all positions from the selvedge. It has been found that the porosity readings for each type of fabric obey the Normal Distribution Law and in accordance with this law, the standard error of the mean obtained from a number of random readings is inversely proportional to the square root of the number of readings. It is shown that little advantage is gained in taking the mean of more than 10 random readings on a sample or parachute in order to assess the mean porosity of the sample or parachute. ARC RM 2313.

PB 98017 Horigan, Francis D. and Sage, Cary R. A PATENT AND LITERATURE SURVEY ON SHRINKAGE AND SHRINKAGE CONTROL OF TEXTILE FABRICS. Jan 1948. 70p Mi $3.00, Ph $8.75.
The following bibliography comprises a patent and literature survey on "Shrinkage and Shrinkage Control of Textile Fabrics". The survey includes references to the cause, mechanism, and prevention of laundering shrinkage of animal, vegetable and synthetic yarns, fibers, and fabrics, and garments made therefrom. Particular emphasis is given to methods for controlling the shrinkage or stabilizing the dimensions of fabrics to laundering by either mechanical or chemical means. The arrangement of the bibliography is chronological as may be seen in the numbering of the entries. The scope of the survey covers the years 1937 to 1947 inclusive. Journal abstracts and patent citations are arranged alphabetically according to subject headings for each year. Where originals were not easily available, abstract journals were used as source material. Those employed were Chemical Abstracts, British Chemical and Physiological Abstracts, Textile Technology Digest, and the Journal of the Textile Institute. As complete a search as possible, time permitting, was made of British and U. S. Patent Specifications relating to the subject. A

PB 98017 (Cont'd)
"name index", comprising the names of authors and inventors, together with a numerical "patent index" is appended. QMC TL BS3.

PB 97986 Lancaster, N., Jr. and Dermott, Charles V. AMBLER SUPER-DRAFT SYSTEM: INVENTION FOR HIGH SPEED DRAFTING IN THE WORSTED DRAWING PROCESS. Jun 1949. 7p Mi $1.25, Ph $1.25. U. S. Consulate, Bradford, England, Unclassified Report no. 38.

PB 98014 Stoll, R. G. AN IMPROVED MULTIPURPOSE ABRASION TESTER AND ITS APPLICATION FOR THE EVALUATION OF THE WEAR RESISTANCE OF TEXTILES. n.d. 46p photos, diagrs, graphs, tables Mi $2.50, Ph $6.25. On the basis of a systematic consideration of the mechanics of fabric wear and abrasion, and extensive experimentation with various test methods and machines, an improved multi-purpose abrasion tester has been developed under the research program of the Quartermaster Corps. This work was carried out jointly by the Quartermaster Textile Materials Engineering Laboratory and the Textile Section of the National Bureau of Standards. The apparatus is capable of quantitatively measuring resistance to flat, edge, and flex abrasion under carefully controlled conditions, producing macro- and micro-wear patterns which are the same as those obtained in actual wear. Materials tested in the machine are abraded to an endpoint which is quantitatively defined and independent of individual judgment. Deviation in test results due to the machine are insignificant compared to the deviation of the samples themselves. A correlation has been found to exist between accelerated combat wear data and results obtained on the new tester. QMC TSR 54.

PB 97900 Weatherburn, Muriel THE ROTPROOFING OF TEXTILES AND RELATED MATERIALS. Jun 1947. 184p Mi $6.75, Ph $23.75. 1. Textiles - Rot proofing - Bibliography 2. NRCC 1601.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

PB 97092 Dawson, J. R. and others. TANK TESTS TO DETERMINE THE EFFECT ON PLANING-TAIL HULLS OF VARYING LENGTH, WIDTH, AND PLAN-FORM TAPER OF AFTERBODY. 1946. 8p drawings, graphs Available from Superintendent of Documents, U. S. Govt. Printing Office, Washington 25, D. C. $.15.
Tests were made with afterbodies of two widths, two lengths, and two tapers. In the tests the depth of step and the angle of afterbody keel were held constant. In general, the planing-tail hulls had much lower resistance than conventional hulls. A typical conventional hull compared with a planing-tail hull had 40 percent greater resistance at the hump speed and from 75 percent to more than 100 percent greater resistance near the get-away speed; but in an actual

PB 97092 (Cont'd)
application of the planing-tail hull the center of gravity would have to be located aft of the step in order to obtain the reduction in resistance at hump speed. NACA 844.

PB 97207 Edge, Philip M., Jr. HYDRODYNAMIC IMPACT LOADS IN SMOOTH WATER FOR A PRISMATIC FLOAT HAVING AN ANGLE OF DEAD RISE OF 40°. Jan 1949. 22p photo, graphs, tables Mi $2.00, Ph $3.75.
Hydrodynamic loads data obtained at the Langley impact basin from tests of a prismatic float forebody with 40° angle of dead rise are presented. Tests were made in smooth water at fixed trims of 3°, 6°, 9°, and 12° for a range of flight-path angles from approximately 2° to 22°. The data are presented as dimensionless variables which are correlated with theory. An experimental value of the dead-rise function is compared with similar values for 30° and $22\frac{1}{2}$° and with the theoretical dead-rise function. The data are found to be in very good agreement with values predicted by theory. NACA TN 1775.

PB 96895 Frick, Charles W. and Chubb, Robert S. LONGITUDINAL STABILITY OF ELASTIC SWEPT WINGS AT SUPERSONIC SPEED. Feb 1949. 38p graphs Mi $2.25, Ph $5.00.
Lifting-surface theory is applied to the estimation of some of the aeroelastic characteristics of swept wings at supersonic speeds. In particular, expressions are derived for the lift, pitching moment, and span load distribution. The analysis is made possible by certain approximations in the structural aspects of the problem. These approximations limit the application of the analysis to swept wings of high aspect ratio operating at low dynamic pressure. It is noted that a special strip theory may be used as a good approximation for the rigorous lifting-surface theory, a simplification which may permit the structural characteristics of the wing to enter the analysis more completely. NACA TN 1811.

PB 97217 Goodman, Alex and Fisher, Lewis R. INVESTIGATION AT LOW SPEEDS OF THE EFFECT OF ASPECT RATIO AND SWEEP ON ROLLING STABILITY DERIVATIVES OF UNTAPERED WINGS. Mar 1949. 37p photos, drawings, table Mi $2.25, Ph $5.00.
Contains wind-tunnel results of the effects of aspect ratio and sweep (when varied independently) on the rolling stability derivatives of a series of untapered wings tested in the 6-foot-diameter rolling-flow test section of the Langley stability tunnel. Data are used to develop an empirical method for correcting available theory on the yawing moment due to rolling for effects of wing-tip suction and drag. Comparisons of experimental and theoretical results are included. NACA TN 1835.

PB 97178 Jones, Alun R. INVESTIGATION OF A THERMAL ICE-PREVENTION SYSTEM FOR A TWIN-ENGINE TRANSPORT AIRPLANE. 1946. 37p photos, drawings, graphs, tables Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $.25.
The thermal system investigated was based upon the transfer of heat from the engine exhaust gas to air, which is then caused to flow along the inner surface

of any portion of the airplane for which protection is desired. The investigation consisted of (1) the analysis of the heat requirements for ice protection of the wings, empennage, and windshield; (2) the design, fabrication, and installation of the thermal system in the test airplane; (3) performance tests of the system in clear air and in natural icing conditions, at various altitudes and engine operating conditions; and (4) the evaluation of the effects of the system on the airplane cruise performance and the structural integrity of the wings. For the determination of the thermal performance of the system, venturi meters and thermocouples were installed to measure the heated-airflow rates throughout the system and the resultant temperature rise of the surfaces to be protected. Flight tests were made in clear air to obtain data for comparison with the design analysis, supplemented by actual performance tests in natural-icing conditions during which both thermal data and observations of the ice-prevention and removal capabilities of the thermal system were recorded. To determine the effects of the thermal ice-prevention installation on the airplane cruise performance, comparative flight tests were undertaken with the airplane in the original and the revised conditions. NACA 862.

PB 97075 Kaplan, Carl EFFECT OF COMPRESSIBILITY AT HIGH SUBSONIC VELOCITIES ON THE LIFTING FORCE ACTING ON ALL ELLIPTIC CYLINDER. 1946. 10p drawing, graph, tables Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $.15.
An extended form of the Ackeret iteration method, applicable to arbitrary profiles, is utilized to calculate the compressible flow at high subsonic velocities past an elliptic cylinder. The angle of attack to the direction of the undisturbed stream is small and the circulation is fixed by the Kutta condition at the trailing end of the major axis. The expression for the lifting force on the elliptic cylinder is derived and shows a first-step improvement of the Prandtl-Glauert rule. It is further shown that the expression for the lifting force, although derived specifically for an elliptic cylinder, may be extended to arbitrary symmetrical profiles. NACA 824.

PB 97202 Purser, Paul E. and Campbell, John P. EXPERIMENTAL VERIFICATION OF A SIMPLIFIED VEE-TAIL THEORY AND ANALYSIS OF AVAILABLE DATA ON COMPLETE MODELS WITH VEE TAILS. 1945. 21p drawings, graphs, tables Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $.20.
An analysis has been made of available data on vee-tail surfaces. Previously published theoretical studies of vee tails have been extended to include the control effectiveness and control forces in addition to the stability. Tests of two isolated tail surfaces with various amounts of dehedral provided a check of the theory. Methods for designing vee tails were also developed and are given in the present paper. The analysis indicated that a vee tail designed to provide values of stability and control parameters equal to those provided by a conventional tail would probably provide no reduction in area unless the conventional vertical tail is in a bad canopy wake or unless the vee tail has a higher effective aspect ratio than the conventional vertical and horizontal tails. NACA 823.

PB 97147 Runyan, Harry L. and Watkins, Charles E. FLUTTER OF A UNIFORM WING WITH AN ARBITRARILY PLACED MASS ACCORDING TO A DIFFERENTIAL-EQUATION ANALYSIS AND A COMPARISON WITH EXPERIMENT. Mar 1949. 50p graphs, tables Mi $2.50, Ph $6.25.
A method is presented for the calculation of the flutter speed of a uniform wing carrying an arbitrarily placed concentrated mass. The method, an extension of recently published work by Goland and Luke, involves the solution of the differential equations of motion of the wing at flutter speed and therefore does not require the assumption of specific normal modes of vibration. The differential equations are solved by operational methods and a brief discussion of this method is given. Some calculations for a specific problem are compared with experimental results and a sample calculation of one particular case is given. NACA TN 1848.

PB 97191r Smilg, Ben EMPIRICAL FORMULAS FOR THE FUNDAMENTAL NATURAL BENDING FREQUENCIES OF CANTILEVER DURALUMIN WINGS. Jan 1947. 13p Mi $1.75, Ph $2.50.
This report presents the test data available to the Air Materiel Command at the present time regarding the fundamental natural bending frequencies of cantilever duralumin wings. A study of the data reveals that the wing span is the most important variable and that for wings that are fabricated of the same materials, the fundamental natural frequency in bending is approximately inversely proportional to the wing span. It is shown that the type of construction, aspect ratio, taper ratio, thickness ratio, design load factor, cutouts, and the number of engines mounted on the wing (within conventional limits) have only a secondary influence upon the fundamental wing bending frequency. The test data is presented in a form which will enable airplane designers to estimate the fundamental natural bending frequency of cantilever duralumin wings with reasonable accuracy while the design is still in a highly preliminary stage. AAF TR 4525-1

PB 97028 Sweberg, Harold H. and Dingeldein, Richard C. SUMMARY OF MEASUREMENTS IN LANGLEY FULL-SCALE TUNNEL OF MAXIMUM LIFT COEFFICIENTS AND STALLING CHARACTERISTICS OF AIRPLANES. 1945. 36p photos, drawings, graphs, tables Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $.25.
The results of measurements in the Langley full-scale tunnel of the maximum lift coefficients and stalling characteristics of airplanes have been collected. The data have been analyzed to show the nature of the effects of maximum lift and stall of wing geometry, fuselages and nacelles, propeller slip-stream, surface roughness, and wing leading-edge appendages such as ducts, armaments, tip slats, and airspeed heads. Comparisons of full-scale-tunnel and flight measurements of maximum lift and stall are included in some cases and the effects of the different testing techniques on the maximum-lift measurements are also given. NACA 829.

Instruments

PB 97423 Blades, L. G. and Kaniss, S. TEST AND EVALUATION OF GERMAN LIGHTWEIGHT AUTOMATIC PILOT - TYPE K-23. Dec 1948. 79p photos, drawings, graphs, tables Mi $3.50, Ph $10.00. NAES AIL 49-48.

PB 97820 Decker, M. S. FLIGHT TESTS WITH THE LIQUIDOMETER DUAL TRANSMITTER AND DAMPENED GAGE FUEL QUANTITY SYSTEM. Sep 1947. 4p tables Mi $1.25, Ph $1.25. 1. Fuels, Aviation - Altitude effect 2. Fuels, Aviation - Flow 3. Gages, Fuel 4. C-82 (Airplane) 5. Fairchild Engine and Airplane Corp., Fairchild Aircraft Div., Hagerstown, Md.

PB 97700 Jones, Robert T. and Sternfield, Leonard. A METHOD FOR PREDICTING THE STABILITY IN ROLL OF AUTOMATICALLY CONTROLLED AIRCRAFT BASED ON THE EXPERIMENTAL DETERMINATION OF THE CHARACTERISTICS OF AN AUTOMATIC PILOT. Jun 1949. 13p graphs Available from U. S. Supt. of Documents, Washington 25, D. C. $.15.
A method is suggested for predicting the stability of automatically controlled aircraft by a comparison of calculated frequency-response curves for the aircraft and experimentally determined frequency-response curves for the automatic pilot. The method is applied only to stabilization in roll. The method is expected to be useful as a means of establishing the specifications of the performance required of the automatic control device for pilotless aircraft designed as missiles. NACA TN 1901.

PB 97698 Lewis, William and Hoecker, Walter H., Jr. OBSERVATIONS OF ICING CONDITIONS ENCOUNTERED IN FLIGHT DURING 1948. Jun 1949. 43p graphs, tables Mi $2.50, Ph $6.25.
Meteorological data from 40 flights in icing conditions are presented. The report also includes a discussion of the relation between the horizontal extent of icing conditions and the average liquid-water content observed therein, the reliability of flight measurements of drop-size distribution, and an apparent geographical influence upon the size of cloud drops. NACA TN 1904.

PB 97543 Livengood, James C. IMPROVEMENT OF ACCURACY OF BALANCED-PRESSURE INDICATORS AND DEVELOPMENT OF AN INDICATOR CALIBRATING MACHINE. Jun 1949. 37p photos, diagrs, graphs Mi $2.25, Ph $5.00.
Tests and comparisons of clamped- and unclamped- diaphragm balanced-pressure indicators, electrical indicators, and a sampling-valve indicator are presented. The unclamped-diaphragm unit was found to give very satisfactory light-spring diagrams from a high-speed engine. A description is given of the square-pressure-wave calibrating valve. NACA TN 1896.

PB 97464 Marshall, F. F. and Fairfoul, W. E. KRUPPS, ESSEN, AND INCORPORATING INFORMATION ON LUFTFAHRTGERAETEWERKE HAKENFELD, BERLIN, AND ACTIVITIES BY DUDENHAUSEN, AT RIETBERG. Nov 1945. 8p Mi $1.25, Ph $1.25. 1. Pilots, Automatic - Servo motors - Germany 2. Krupp, Friedrich A. G., Essen, Ger. 3. Luftfahrtgerätewerk Hakenfelde G.m. b.H., Berlin 4. BIOS FR 286, Item 25.